

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



## NOTICE OF AN APPLICATION TO AMEND A WATER USE PERMIT

APPLICATION NO. 5731A

Lower Colorado River Authority (LCRA) seeks to amend Water Use Permit No. 5731 (Permit) to authorize its existing J. Scott Arbuckle Reservoir, authorized by Certificate of Adjudication No. 14-5476, as a specific off-channel reservoir in which LCRA can store water diverted under the Permit. The reservoir is located within the Colorado River Basin in Wharton County. More information on the application and how to participate in the permitting process is given below.

**APPLICATION.** Lower Colorado River Authority, P.O. Box 220, Austin, Texas 78767-0220, Applicant, has applied to the Texas Commission on Environmental Quality (TCEQ) for a Water Use Permit pursuant to Texas Water Code (TWC) §§ 11.122, 11.085 and TCEQ Rules Title 30 Texas Administrative Code (TAC) §§ 295.1, et seq. Published and mailed notice to the water right holders of record in the Colorado River Basin is required pursuant to Title 30 TAC § 295.158(b) and the terms of the permit.

Water Use Permit No. 5731 authorizes Lower Colorado River Authority (LCRA) to divert not to exceed 853,514 acre-feet of water per year, at a maximum combined diversion rate of 10,000 cfs (4,488,300 gpm), from five points on the Colorado River, Colorado River Basin, for storage in off-channel reservoirs for subsequent diversion and use of not to exceed 327,591 acre-feet of water per year for municipal, industrial, and agricultural purposes within LCRA's service area.

LCRA is further authorized an exempt interbasin transfer to those portions of LCRA's service area within the Brazos and Lavaca River Basins, and the Brazos-Colorado and Colorado-Lavaca Coastal Basins for municipal, industrial, and agricultural purposes.

The time priority of the water right is February 28, 2001.

LCRA is authorized to construct a series of off-channel reservoirs within Colorado, Wharton, and Matagorda counties with a maximum combined storage capacity of 500,000 acre-feet.

Multiple special conditions also apply including Paragraph 6.E.(i) which requires that within 10 years of issuance, and prior to diversion or impoundment of water under the Permit, LCRA shall apply for an amendment to either authorize specific off-channel reservoir(s) or extend the time for filing an amendment to authorize specific off-channel reservoir(s).

Paragraph 6.E.(ii) requires LCRA to include specific information in its amendment application to authorize specific off-channel reservoirs to address impingement and entrainment, mitigation, and issues related to the impacts, if any, to water quality or instream flows of any tributaries affected by the specific reservoir(s).

LCRA seeks to amend Water Use Permit No. 5731 to authorize LCRA's J. Scott Arbuckle Reservoir, authorized by Certificate of Adjudication No. 14-5476 (Certificate), as a specific off-channel reservoir in which LCRA can store water diverted under the Permit.

J. Scott Arbuckle Reservoir has a maximum authorized storage capacity of 52,000 acre-feet of water, and is located at Latitude 29.19510° N and Longitude 96.042949° W within the Colorado River Basin in Wharton County, ZIP code 77453.

LCRA indicates that diversion of water authorized by the Permit and into J. Scott Arbuckle Reservoir will occur at the diversion point authorized in Paragraph 3.A.(iii) of the Permit and rely on the diversion facilities authorized in Paragraph 3.A.(1) of the Certificate.

Paragraphs 6.C.(v)(c) & 6.C.(v)(d) of the Permit require LCRA to conduct a salinity analysis prior to submitting an application to amend the Permit if the application is submitted at least five years after issuance of the Permit, and to provide documentation of consultation with all entities named as parties to the contested case hearing on the original application and include any comments from those parties regarding the salinity analysis in the application.

LCRA submitted the results of the salinity analysis, documentation of consultation with the parties to the contested case hearing on the original application, and comments from the parties on the salinity analysis.

Paragraph 6.F. of the Permit requires LCRA to submit an accounting plan prior to amending the Permit to add a specific off-channel reservoir.

Paragraph 6.F. includes minimum requirements for the accounting plan and requires LCRA to submit documentation of consultation with all entities named as parties to the contested case hearing on the original application and include any comments from those parties regarding the accounting plan in the application.

LCRA submitted the accounting plan, documentation of consultation with the parties to the contested case hearing on the original application, and comments from the parties on the accounting plan.

The application and fees were received on December 23, 2020. The application was declared administratively complete and accepted for filing with the Office of the Chief Clerk on February 3, 2021.

The Executive Director has completed the technical review of the application and prepared a draft amendment. The draft amendment, if granted, would include a special condition regarding the accounting plan. The application, technical memoranda, and Executive Director's draft amendment are available for viewing on the TCEQ web page at [https://www.tceq.texas.gov/permitting/water\\_rights/wr-permitting/view-wr-pend-apps](https://www.tceq.texas.gov/permitting/water_rights/wr-permitting/view-wr-pend-apps). Alternatively, you may request a copy of the documents by contacting the TCEQ Office of the Chief Clerk by phone at (512) 239-3300 or by mail at TCEQ OCC, Notice Team (MC-105), P.O. Box 13087, Austin, Texas 78711.

**PUBLIC COMMENT / PUBLIC MEETING.** Written public comments and requests for a public meeting should be submitted to the Office of the Chief Clerk, at the address provided in the information section below, within 30 days of the date of newspaper publication of the notice. A public meeting is intended for the taking of public comment, and is not a contested case hearing. A public meeting will be held if the Executive Director determines that there is a significant degree of public interest in the application.

**CONTESTED CASE HEARING.** The TCEQ may grant a contested case hearing on this application if a written hearing request is filed within 30 days from the date of newspaper publication of this notice. The Executive Director may approve the application unless a written request for a contested case hearing is filed within 30 days after newspaper publication of this notice.



To request a contested case hearing, you must submit the following: (1) your name (or for a group or association, an official representative), mailing address, daytime phone number, and fax number, if any; (2) applicant's name and permit number; (3) the statement "[I/we] request a contested case hearing;" (4) a brief and specific description of how you would be affected by the application in a way not common to the general public; and (5) the location and distance of your property relative to the proposed activity. You may also submit proposed conditions for the requested permit which would satisfy your concerns. Requests for a contested case hearing must be submitted in writing to the Office of the Chief Clerk at the address provided in the information section below.

If a hearing request is filed, the Executive Director will not issue the permit and will forward the application and hearing request to the TCEQ Commissioners for their consideration at a scheduled Commission meeting.

**INFORMATION.** Written hearing requests, public comments or requests for a public meeting should be submitted to the Office of the Chief Clerk, MC 105, TCEQ, P.O. Box 13087, Austin, TX 78711-3087 or electronically at <http://www14.tceq.texas.gov/epic/eComment/> by entering WRPERM 5731 in the search field. For information concerning the hearing process, please contact the Public Interest Counsel, MC 103, at the same address.

For additional information, individual members of the general public may contact the Public Education Program at 1-800-687-4040. General information regarding the TCEQ can be found at our web site at [www.tceq.texas.gov](http://www.tceq.texas.gov). Si desea información en Español, puede llamar al 1-800-687-4040 o por el internet al <http://www.tceq.texas.gov>.

Issued: December 14, 2022

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



## AMENDMENT TO A WATER USE PERMIT

PERMIT NO. 5731A		TYPE: §§ 11.122, 11.085
Permittee:	Lower Colorado River Authority	Address: P.O. Box 220 Austin, Texas 78767-0220
Filed:	February 3, 2021	Granted:
Purposes:	Municipal, Industrial, and Agricultural	County: Colorado, Wharton, and Matagorda
Watercourse:	Colorado River	Watersheds: Colorado River Basin, Brazos River Basin, Lavaca River Basin, Brazos-Colorado Coastal Basin, and the Colorado-Lavaca Coastal Basin

WHEREAS, Water Use Permit No. 5731 (Permit) authorizes Lower Colorado River Authority (LCRA) to divert not to exceed 853,514 acre-feet of water per year, at a maximum combined diversion rate of 10,000 cfs (4,488,300 gpm), from five points on the Colorado River, Colorado River Basin, for storage in off-channel reservoirs for subsequent diversion and use of not to exceed 327,591 acre-feet of water per year for municipal, industrial, and agricultural purposes within LCRA's service area; and

WHEREAS, LCRA is further authorized an exempt interbasin transfer to those portions of LCRA's service area within the Brazos and Lavaca River Basins, and the Brazos-Colorado and Colorado-Lavaca Coastal Basins for municipal, industrial, and agricultural purposes; and

WHEREAS, the time priority of the water right is February 28, 2001; and

WHEREAS, LCRA is authorized to construct a series of off-channel reservoirs within Colorado, Wharton, and Matagorda counties with a maximum combined storage capacity of 500,000 acre-feet; and

WHEREAS, multiple special conditions apply including Paragraph 6.E.(i) which requires that within 10 years of issuance, and prior to diversion or impoundment of water under the Permit, LCRA shall apply for an amendment to either authorize specific off-channel reservoir(s) or extend the time for filing an amendment to authorize specific off-channel reservoir(s); and

WHEREAS, Paragraph 6.E.(ii) requires LCRA to include specific information in its amendment application to authorize specific off-channel reservoirs to address impingement and entrainment, mitigation, and issues related to the impacts, if any, to water quality or instream flows of any tributaries affected by the specific reservoir(s); and

WHEREAS, LCRA seeks to amend Water Use Permit No. 5731 to authorize LCRA's J. Scott Arbuckle Reservoir, authorized by Certificate of Adjudication No. 14-5476 (Certificate), as a specific off-channel reservoir in which LCRA can store water diverted under the Permit; and

WHEREAS, J. Scott Arbuckle Reservoir has a maximum authorized storage capacity of 52,000 acre-feet of water, and is located at Latitude 29.19510° N and Longitude 96.042949° W within the Colorado River Basin in Wharton County; and

WHEREAS, LCRA indicates that diversion of water authorized by the Permit and into J. Scott Arbuckle Reservoir will occur at the diversion point authorized in Paragraph 3.A.(iii) of the Permit and rely on the diversion facilities authorized in Paragraph 3.A.(1) of the Certificate; and

WHEREAS, Paragraphs 6.C.(v)(c) & 6.C.(v)(d) of the Permit require LCRA to conduct a salinity analysis prior to submitting an application to amend the Permit if the application is submitted at least five years after issuance of the Permit, and to provide documentation of consultation with all entities named as parties to the contested case hearing on the original application and include any comments from those parties regarding the salinity analysis in the application; and

WHEREAS, LCRA submitted the results of the salinity analysis, documentation of consultation with the parties to the contested case hearing on the original application, and comments from the parties on the salinity analysis; and

WHEREAS, Paragraph 6.F of the Permit requires LCRA to submit an accounting plan prior to amending the Permit to add a specific off-channel reservoir; and

WHEREAS, Paragraph 6.F. includes minimum requirements for the accounting plan and requires LCRA to submit documentation of consultation with all entities named as parties to the contested case hearing on the original application and include any comments from those parties regarding the accounting plan in the application; and

WHEREAS, LCRA submitted the accounting plan, documentation of consultation with the parties to the contested case hearing on the original application, and comments from the parties on the accounting plan; and

WHEREAS, the Texas Commission on Environmental Quality finds that jurisdiction over the application is established; and

WHEREAS, the Executive Director reviewed the results of the salinity analysis and determined that the salinity analysis met the requirements of the special conditions in the Permit; and

WHEREAS, the Executive Director has approved the *Permit 5731 Accounting Plan*; and

WHEREAS, the Executive Director recommends a special condition be included in this amendment; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Commission on Environmental Quality in issuing this amendment;

NOW, THEREFORE, this amendment to Water Use Permit No. 5731, designated Water Use Permit No. 5731A, is issued to Lower Colorado River Authority, subject to the following terms and conditions:

1. USE

In addition to previous authorizations, permittee is authorized to store water diverted from the Colorado River in J. Scott Arbuckle Reservoir, authorized by Certificate of Adjudication No. 14-5476, for subsequent diversion and use.

2. SPECIAL CONDITION

In lieu of Paragraph 6.F.(ii):

(ii) Permittee shall file with any proposed substantive revision of *Permit 5731 Accounting Plan*, documentation of consultation with all entities named as parties to the contested case hearing on the original application for this permit and of any comments received from those entities on the contents of the accounting plan. The Executive Director shall consider those comments in determining the adequacy of the proposed substantive revision.

This amendment is issued subject to all terms, conditions and provisions contained in Water Use Permit No. 5731, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Colorado River Basin.

Permittee agrees to be bound by the terms, conditions, and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Commission on Environmental Quality and to the right of continuing supervision of State water resources exercised by the Commission.

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For the Commission

Date Issued:

**From:** [Monica Masters](#)  
**To:** [Sarah Henderson](#)  
**Subject:** Re: Lower Colorado River Authority WRPERM No. 5731A  
**Date:** Wednesday, November 23, 2022 2:30:25 PM

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Good afternoon Sarah,

We don't have any comments to the attached drafts. We are good for you to proceed.

Thank you for the opportunity.

Thanks,  
Monica

Get [Outlook for iOS](#)

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**From:** Sarah Henderson <sarah.henderson@tceq.texas.gov>  
**Sent:** Wednesday, November 23, 2022 2:24:55 PM  
**To:** Monica Masters [REDACTED]  
**Subject:** FW: Lower Colorado River Authority WRPERM No. 5731A

**CAUTION - EXTERNAL EMAIL**  
Suspicious Email? **Click the fish!**

Ms. Masters,  
Could you please provide a status update on the applicants response to the attached drafts?  
Thank you,  
Sarah

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**From:** Sarah Henderson  
**Sent:** Thursday, October 20, 2022 12:31 PM  
**To:** Monica Masters <[REDACTED]>  
**Subject:** Lower Colorado River Authority WRPERM No. 5731A

Ms. Masters,

Please find the attached draft public notice, amendment and associated technical memoranda for your review.

Any comments or questions are requested by November 3, 2022.

Thank you,  
Sarah

Sarah Henderson  
Water Rights Permitting Team  
Water Availability Division  
Texas Commission on Environmental Quality  
P.O. Box 13087/MC-160  
Austin, TX 78711-3087

(P) 512.239.2535  
(F) 512.239.4770



**From:** [Sarah Henderson](#)  
**To:** [Monica Masters](#)  
**Subject:** Lower Colorado River Authority WRPERM No. 5731A  
**Date:** Thursday, October 20, 2022 12:30:00 PM  
**Attachments:** [LCRA\\_5731A\\_Drafts.pdf](#)

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Ms. Masters,

Please find the attached draft public notice, amendment and associated technical memoranda for your review.

Any comments or questions are requested by November 3, 2022.

Thank you,  
Sarah

Sarah Henderson  
Water Rights Permitting Team  
Water Availability Division  
Texas Commission on Environmental Quality  
P.O. Box 13087/MC-160  
Austin, TX 78711-3087  
(P) 512.239.2535  
(F) 512.239.4770

Jon Niermann, *Chairman*  
Emily Lindley, *Commissioner*  
Bobby Janecka, *Commissioner*  
Toby Baker, *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

October 20, 2022

Ms. Monica Masters, P.E., PMP  
Lower Colorado River Authority  
P.O. Box 220, RBC 316  
Austin, TX 78767-0220

**VIA E-MAIL**

RE: Lower Colorado River Authority  
WRPERM 5731  
CN600253637, RN104090238  
Application No. 5731A to Amend Water Use Permit No. 5731  
Texas Water Code §§ 11.122, 11.085, Requiring Published and Mailed Notice  
Colorado River, Colorado River Basin  
Wharton County

Dear Ms. Masters:

Drafts, subject to revision, of the public notice, proposed amendment to Water Use Permit No. 5731, and the related technical memoranda are attached.

Staff is recommending that the referenced application be granted in accordance with the attached drafts. Please review the drafts and contact me no later than November 3, 2022 with any comments or questions as the notice will be forwarded to the Office of the Chief Clerk for mailing after that date.

Please note this application requires a 30-day comment period and once the comment period has closed, the proposed amendment to Water Use Permit No. 5731 may be issued as drafted given no hearing requests are received.

If you have any questions concerning this matter please contact me via email at [sarah.henderson@tceq.texas.gov](mailto:sarah.henderson@tceq.texas.gov) or by telephone at (512) 239-2535.

Sincerely,

*Sarah Henderson*

Sarah Henderson, Project Manager  
Water Rights Permitting Team  
Water Rights Permitting and Availability Section

Attachments

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



## NOTICE OF AN APPLICATION TO AMEND A WATER USE PERMIT

APPLICATION NO. 5731A

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**APPLICATION.** Lower Colorado River Authority, P.O. Box 220, Austin, Texas 78767-0220, Applicant, has applied to the Texas Commission on Environmental Quality (TCEQ) for a Water Use Permit pursuant to Texas Water Code (TWC) §§ 11.122, 11.085 and TCEQ Rules Title 30 Texas Administrative Code (TAC) §§ 295.1, et seq. Published and mailed notice to the water right holders of record in the Colorado River Basin is required pursuant to Title 30 TAC § 295.158(b) and the terms of the permit.

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For additional information, individual members of the general public may contact the Public Education Program at 1-800-687-4040. General information regarding the TCEQ can be found at our web site at [www.tceq.texas.gov](http://www.tceq.texas.gov). Si desea información en Español, puede llamar al 1-800-687-4040 o por el internet al <http://www.tceq.texas.gov>.

Issued:

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



AMENDMENT TO A  
WATER USE PERMIT

PERMIT NO. 5731A		TYPE: §§ 11.122, 11.085
Permittee:	Lower Colorado River Authority	Address: P.O. Box 220 Austin, Texas 78767-0220
Filed:	February 3, 2021	Granted:
Purposes:	Municipal, Industrial, and Agricultural	County: Colorado, Wharton, and Matagorda
Watercourse:	Colorado River	Watersheds: Colorado River Basin, Brazos River Basin, Lavaca River Basin, Brazos-Colorado Coastal Basin, and the Colorado-Lavaca Coastal Basin

WHEREAS, Water Use Permit No. 5731 (Permit) authorizes Lower Colorado River Authority (LCRA) to divert not to exceed 853,514 acre-feet of water per year, at a maximum combined diversion rate of 10,000 cfs (4,488,300 gpm), from five points on the Colorado River, Colorado River Basin, for storage in off-channel reservoirs for subsequent diversion and use of not to exceed 327,591 acre-feet of water per year for municipal, industrial, and agricultural purposes within LCRA's service area; and

WHEREAS, LCRA is further authorized an exempt interbasin transfer to those portions of LCRA's service area within the Brazos and Lavaca River Basins, and the Brazos-Colorado and Colorado-Lavaca Coastal Basins for municipal, industrial, and agricultural purposes; and

WHEREAS, the time priority of the water right is February 28, 2001; and

WHEREAS, LCRA is authorized to construct a series of off-channel reservoirs within Colorado, Wharton, and Matagorda counties with a maximum combined storage capacity of 500,000 acre-feet; and

WHEREAS, multiple special conditions apply including Paragraph 6.E.(i) which requires that within 10 years of issuance, and prior to diversion or impoundment of water under the Permit, LCRA shall apply for an amendment to either authorize specific off-channel reservoir(s) or extend the time for filing an amendment to authorize specific off-channel reservoir(s); and



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WHEREAS, LCRA seeks to amend Water Use Permit No. 5731 to authorize LCRA's J. Scott Arbuckle Reservoir, authorized by Certificate of Adjudication No. 14-5476 (Certificate), as a specific off-channel reservoir in which LCRA can store water diverted under the Permit; and

WHEREAS, J. Scott Arbuckle Reservoir has a maximum authorized storage capacity of 52,000 acre-feet of water, and is located at Latitude 29.19510° N and Longitude 96.042949° W within the Colorado River Basin in Wharton County; and

WHEREAS, LCRA indicates that diversion of water authorized by the Permit and into J. Scott Arbuckle Reservoir will occur at the diversion point authorized in Paragraph 3.A.(iii) of the Permit and rely on the diversion facilities authorized in Paragraph 3.A.(1) of the Certificate; and

WHEREAS, Paragraphs 6.C.(v)(c) & 6.C.(v)(d) of the Permit require LCRA to conduct a salinity analysis prior to submitting an application to amend the Permit if the application is submitted at least five years after issuance of the Permit, and to provide documentation of consultation with all entities named as parties to the contested case hearing on the original application and include any comments from those parties regarding the salinity analysis in the application; and

WHEREAS, LCRA submitted the results of the salinity analysis, documentation of consultation with the parties to the contested case hearing on the original application, and comments from the parties on the salinity analysis; and

WHEREAS, Paragraph 6.F of the Permit requires LCRA to submit an accounting plan prior to amending the Permit to add a specific off-channel reservoir; and

WHEREAS, Paragraph 6.F. includes minimum requirements for the accounting plan and requires LCRA to submit documentation of consultation with all entities named as parties to the contested case hearing on the original application and include any comments from those parties regarding the accounting plan in the application; and

WHEREAS, LCRA submitted the accounting plan, documentation of consultation with the parties to the contested case hearing on the original application, and comments from the parties on the accounting plan; and

WHEREAS, the Texas Commission on Environmental Quality finds that jurisdiction over the application is established; and

WHEREAS, the Executive Director reviewed the results of the salinity analysis and determined that the salinity analysis met the requirements of the special conditions in the Permit; and

WHEREAS, the Executive Director has approved the *Permit 5731 Accounting Plan*; and

WHEREAS, the Executive Director recommends a special condition be included in this amendment; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Commission on Environmental Quality in issuing this amendment;

NOW, THEREFORE, this amendment to Water Use Permit No. 5731, designated Water Use Permit No. 5731A, is issued to Lower Colorado River Authority, subject to the following terms and conditions:

1. USE

In addition to previous authorizations, permittee is authorized to store water diverted from the Colorado River in J. Scott Arbuckle Reservoir, authorized by Certificate of Adjudication No. 14-5476, for subsequent diversion and use.

2. SPECIAL CONDITION

In lieu of Paragraph 6.F.(ii):

(ii) Permittee shall file with any proposed substantive revision of *Permit 5731 Accounting Plan*, documentation of consultation with all entities named as parties to the contested case hearing on the original application for this permit and of any comments received from those entities on the contents of the accounting plan. The Executive Director shall consider those comments in determining the adequacy of the proposed substantive revision.

This amendment is issued subject to all terms, conditions and provisions contained in Water Use Permit No. 5731, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Colorado River Basin.

Permittee agrees to be bound by the terms, conditions, and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Commission on Environmental Quality and to the right of continuing supervision of State water resources exercised by the Commission.

-----  
For the Commission

Date Issued:

**Texas Commission on Environmental Quality**

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INTEROFFICE MEMORANDUM

To: Sarah Henderson, Project Manager                      Date: March 28, 2022  
Water Rights Permitting Team

From: Kathy Alexander, Ph.D., Policy and Technical Analyst  
Water Availability Division

Subject: Lower Colorado River Authority  
ADJ 5731  
CN600253637  
Colorado River, Colorado River Basin  
Wharton County

**HYDROLOGY REVIEW**

**Application Summary**

Water Use Permit No. 5731 (Permit) authorizes Lower Colorado River Authority (LCRA/Permittee) to construct a series of off-channel reservoirs in Colorado, Wharton and Matagorda counties with a maximum combined storage capacity of 500,000 acre-feet and to divert 853,514 acre-feet of water per year from five points on the Colorado River, Colorado River Basin, for storage in the off-channel reservoirs and subsequent diversion of 327,591 acre-feet of water per year for municipal, industrial and agricultural purposes within LCRA's service area.

The Permit also authorizes an exempt interbasin transfer to the portions of LCRA's service area within the Brazos and Lavaca River Basins and the Brazos-Colorado and Colorado-Lavaca Coastal Basins for municipal, industrial, and agricultural purposes. Multiple additional special conditions apply.

Paragraph 6.E(i) of the Permit requires that within 10 years of issuance, and prior to diversion or impoundment of water under the Permit, LCRA must apply for an amendment to either authorize specific off-channel reservoirs or extend the time for filing an amendment to authorize specific off-channel reservoirs. Paragraph 6.E.(ii) requires LCRA to include specific information in its application to address impingement and entrainment, mitigation, and issues related to the impacts, if any, to water quality or instream flows of any tributaries affected by the specific reservoir.

LCRA requests to amend the Permit to authorize LCRA's Arbuckle Reservoir, authorized by Certificate of Adjudication No. 14-5476 (Certificate), as a specific

off-channel reservoir in which LCRA can store water diverted under the Permit. LCRA indicates that diversion of water authorized by the Permit will occur at the diversion point authorized in Paragraph 3.A(iii) of the Permit and the diversion facilities authorized in Paragraph 3.A(1) of the Certificate will be used for diversion from the Colorado River.

LCRA submitted the results of the Salinity Analysis and documentation of consultation with the parties to the contested case hearing on the original application as required by Paragraphs 6.C(v)(c) & 6.C(v)(d) of the Permit. LCRA also submitted an accounting plan and documentation of consultation with the parties, as required by Paragraph 6.F. of the Permit.

The application was declared administratively complete on February 3, 2021.

### **Hydrology Review**

Resource Protection staff reviewed the application. See the Resource Protection memos dated September 1, 2021.

The application does not request a new appropriation of water; therefore, a water availability analysis is not necessary. However, the request to add a specific off-channel reservoir, and the supporting documentation submitted in accordance with the terms and conditions of the Permit, must be reviewed to ensure that no water rights are affected by the requests.

Paragraphs 6.C(v)(c) and 6.C(v)(d) of the Permit, require LCRA to conduct a salinity analysis prior to submitting an application to amend the Permit if the application is submitted at least five years after issuance of the Permit, and to provide documentation of consultation with all entities named as parties to the contested case hearing on the original application and include any comments from those entities regarding the salinity analysis in the application. LCRA submitted the salinity analysis and documentation of consultation with the parties and comments from those entities with the application. Staff reviewed the analysis and documentation and finds them adequate to demonstrate compliance with the terms and conditions of the Permit.

Paragraph 6.F of the Permit requires LCRA to submit an accounting plan prior to amending the Permit to add a specific off-channel reservoir. Paragraph 6.F. includes minimum requirements for the accounting plan and requires LCRA to submit documentation of consultation with all entities named as parties to the contested case hearing on the original application and include any comments from those entities regarding the accounting plan in the application.

LCRA submitted an accounting plan, *Permit 5731 Accounting Plan*, dated October 13, 2020 with revisions submitted on November 19 and December 17,

2020. The accounting plan addresses all of the accounting plan requirements in Paragraph 6.F. of the Permit. Staff reviewed the accounting plan and documentation finds them adequate to demonstrate compliance with the terms and conditions of the Permit.

The Permit authorizes construction of a series of off-channel reservoirs and LCRA is only requesting authorization to stored water diverted under the Permit in an existing authorized off-channel reservoir and did not request changes to the amount of authorized water, the authorized diversion points, or the rate of diversion. Staff's opinion is that if LCRA manages diversions in accordance with the approved accounting plan, which incorporates the special conditions required by the Permit, existing water rights will not be affected.

### **Conclusion**

Staff can support granting the application provided the amendment includes the following revision to Paragraph 6.F.ii to expressly incorporate the approved accounting plan:

In lieu of Paragraph 6.F.ii.:

- ii. Permittee shall file with any proposed substantive revision of *Permit 5731 Accounting Plan*, documentation of consultation with all entities named as parties to the contested case hearing on the original application for this permit and of any comments received from those entities on the contents of the accounting plan. The Executive Director shall consider those comments in determining the adequacy of the proposed substantive revision.

# Texas Commission on Environmental Quality

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## INTEROFFICE MEMORANDUM

**To:** Sarah Henderson, Project Manager      **Date:** September 1, 2021  
Water Rights Permitting Team

**Through:** Jason Godeaux, Team Leader  
Resource Protection Team



Kristin Wang, Senior Water Conservation Specialist  
Resource Protection Team

**From:** Jennifer Allis, Senior Water Conservation Specialist  
Resource Protection Team



**Subject:** Lower Colorado River Authority  
WRPERM 5731  
CN600253637  
Colorado River, Colorado River Basin  
Wharton County

### APPLICATION SUMMARY

Water Use Permit No. 5731 (Permit) authorizes the Lower Colorado River Authority (LCRA) to construct a series of off-channel reservoirs in Colorado, Wharton and Matagorda counties with a maximum combined storage capacity of 500,000 acre-feet and to divert 853,514 acre-feet of water per year from five points on the Colorado River, Colorado River Basin, for storage in the off-channel reservoirs and subsequent diversion of 327,591 acre-feet of water per year for municipal, industrial and agricultural purposes within LCRA's service area.

The Permit also authorizes an exempt interbasin transfer to the portions of LCRA's service area within the Brazos and Lavaca River Basins and the Brazos-Colorado and Colorado-Lavaca Coastal Basins for municipal, industrial, and agricultural purposes. Multiple additional special conditions apply.

Paragraph 6.E(i) of the Permit requires that within 10 years of issuance, and prior to diversion or impoundment of water under the Permit, LCRA must apply for an amendment to either authorize specific off-channel reservoirs or extend the time for filing an amendment to authorize specific off-channel reservoirs. Paragraph 6.E.(ii) requires LCRA to include specific information in its application to address impingement and entrainment, mitigation, and issues related to the impacts, if any, to water quality or instream flows of any tributaries affected by the specific reservoir.



LCRA requests to amend the Permit to authorize LCRA's Arbuckle Reservoir, authorized by Certificate of Adjudication No. 14-5476 (Certificate), as a specific off-channel reservoir in which LCRA can store water diverted under the Permit. LCRA indicates that diversion of water authorized by the Permit will occur at the diversion point authorized in Paragraph 3.A(iii) of the Permit and the diversion facilities authorized in Paragraph 3.A(1) of the Certificate will be used for diversion from the Colorado River.

LCRA submitted the results of the Salinity Analysis and documentation of consultation with the parties to the contested case hearing on the original application as required by Paragraphs 6.C(v)(c) & 6.C(v)(d) of the Permit. LCRA also submitted an accounting plan and documentation of consultation with the parties, as required by Paragraph 6.F. of the Permit.

### **WATER CONSERVATION REVIEW**

Pursuant to 30 Texas Administrative Code §295.9, water conservation and drought contingency plans are not required to be submitted for this application.

Previously known as Lane City Reservoir, the Arbuckle Reservoir was recommended as a water management strategy in the 2016 Region K Water Plan and in the 2017 State Water Plan. Arbuckle Reservoir has been included in the 2021 Region K Water Plan as an existing supply reservoir. As such, the application is consistent with the 2021 Region K Water Plan and the 2022 State Water Plan because there is nothing in the water plans that conflicts with issuing this amendment.

### **RECOMMENDATIONS**

Resource Protection Staff have no recommendations regarding the proposed amendment, if granted.


# Texas Commission on Environmental Quality

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## INTEROFFICE MEMORANDUM

To: Sarah Henderson, Project Manager  
Water Rights Permitting Team

Date: September 1, 2021

Through:  Jason Godeaux, Team Leader  
Resource Protection Team

From: George Gable, Aquatic Scientist  
Resource Protection Team  
*GMGIV*

Subject: Lower Colorado River Authority  
WRPERM 5731  
CN600253637  
Colorado River, Colorado River Basin  
Wharton County

Environmental reviews of water right applications are conducted in accordance with applicable provisions of the Texas Water Code (TWC) and the administrative rules of the Texas Commission on Environmental Quality (TCEQ). The provisions applicable to environmental reviews can vary according to the type and the location of the authorization requested.

### **APPLICATION SUMMARY**

Water Use Permit No. 5731 (Permit) authorizes the Lower Colorado River Authority (LCRA) to construct a series of off-channel reservoirs in Colorado, Wharton and Matagorda counties with a maximum combined storage capacity of 500,000 acre-feet and to divert 853,514 acre-feet of water per year from five points on the Colorado River, Colorado River Basin, for storage in the off-channel reservoirs and subsequent diversion of 327,591 acre-feet of water per year for municipal, industrial and agricultural purposes within LCRA's service area.

The Permit also authorizes an exempt interbasin transfer to the portions of LCRA's service area within the Brazos and Lavaca River Basins and the Brazos-Colorado and Colorado-Lavaca Coastal Basins for municipal, industrial, and agricultural purposes. Multiple additional special conditions apply.

Paragraph 6.E(i) of the Permit requires that within 10 years of issuance, and prior to diversion or impoundment of water under the Permit, LCRA must apply for an amendment to either authorize specific off-channel reservoirs or extend the time for filing an amendment to authorize specific off-channel reservoirs. Paragraph 6.E.(ii) requires LCRA to include specific information in its application to address

impingement and entrainment, mitigation, and issues related to the impacts, if any, to water quality or instream flows of any tributaries affected by the specific reservoir.

LCRA requests to amend the Permit to authorize LCRA's Arbuckle Reservoir, authorized by Certificate of Adjudication No. 14-5476 (Certificate), as a specific off-channel reservoir in which LCRA can store water diverted under the Permit. LCRA indicates that diversion of water authorized by the Permit will occur at the diversion point authorized in Paragraph 3.A(iii) of the Permit and the diversion facilities authorized in Paragraph 3.A(1) of the Certificate will be used for diversion from the Colorado River.

LCRA submitted the results of the Salinity Analysis and documentation of consultation with the parties to the contested case hearing on the original application as required by Paragraphs 6.C(v)(c) & 6.C(v)(d) of the Permit. LCRA also submitted an accounting plan and documentation of consultation with the parties, as required by Paragraph 6.F. of the Permit.

## ENVIRONMENTAL ANALYSIS

**Aquatic and Riparian Habitats:** LCRA's diversion point for the project is located on the Colorado River, a perennial waterbody. This portion of the Colorado River is in the Floodplains and Low Terraces of the Western Gulf Coast Plain ecoregion.

The checklist for the Colorado River basin identified 104 species of ichthyofauna occurring within Wharton County (Hendrickson and Cohen 2015). The interior least tern (*Sterna antillarum athalassos*), Texas fawnsfoot (*Truncilla macrodon*), and Texas pimpleback (*Cyclonaias petrina*), high-interest aquatic species, have been determined to occur in Wharton County (TPWD 2015).

On August 8, 2012, the TCEQ adopted environmental flow standards for the Colorado and Lavaca River, and Matagorda and Lavaca Bays (Title 30 Texas Administrative Code (TAC) Chapter 298 Subchapter D). These environmental flow standards are considered adequate to support a sound ecological environment (Title 30 TAC §298.310). LCRA does not request a new appropriation of water or an amendment that increases the amount of water stored, taken, or diverted; therefore, the environmental flow standards do not apply.

LCRA requests to add Arbuckle Reservoir, authorized for storage of water diverted under the Certificate, as amended, as a specific off-channel reservoir to store water diverted under the Permit. Mitigation requirements and potential impacts to aquatic and riparian habitats associated with Arbuckle Reservoir were addressed during TCEQ's technical review of the amended Certificate. In addition, the application included mitigation information for Arbuckle Reservoir pursuant to Paragraph 6.E.(ii).

**Recreational Uses:** Colorado River (Segment 1402) has a designated primary contact recreation 1 use (TCEQ 2018). LCRA's request should not adversely impact recreational uses.

**Water Quality:** Colorado River (Segment 1402) has designated high aquatic life use (TCEQ 2018). In Segment 1402 Assessment Unit 1402\_02 is identified in the Texas Integrated Report with a concern for screening levels for chlorophyll-a and nitrate (TCEQ 2020). In addition, the application included information on water quality impacts from Arbuckle Reservoir pursuant to Paragraph 6.E.(ii).

**Freshwater Inflows:** The Permit contains salinity monitoring requirements to determine if adjustments to the seasonal inflow criteria in Paragraph 6.C. are necessary. The application included the salinity analysis required by Paragraph 6.C(v)(c). Resource Protection staff reviewed the salinity analysis and determined it meets the requirements of the special conditions in the Permit.

### **RECOMMENDATIONS**

Resource Protection staff have no recommendations regarding this proposed amendment, if granted.

### **LITERATURE CITED**

Griffith, G.E., S.A. Bryce, J.M. Omernik, J.A. Comstock, A.C. Rogers, B. Harrison, S.L. Hatch, and D. Bezanson. 2004. Ecoregions of Texas. (2 sided color poster with map, descriptive text, and photographs). U.S. Geological Survey, Reston, VA. Scale 1:2,500,000.

Hendrickson DA, Cohen AE. 2015. Fishes of Texas Project Database [Internet]. [cited 2021 April 9]; Version 2.0. Available from <http://doi.org/10.17603/C3WC70>

TCEQ. 2018. Texas Surface Water Quality Standards §§307.1-307.10. Austin (TX): Texas Commission on Environmental Quality.

TCEQ. 2020. Texas Integrated Report of Surface Water Quality §§307.1-307.10. Austin (TX): Texas Commission on Environmental Quality.

TPWD. 2015. Rare, Threatened, and Endangered Species of Texas by County [Internet]. Austin (TX): Wharton County, revised March 5, 2021. [cited 2021 April 9]. Available from <http://tpwd.texas.gov/gis/rtest/>.

# TCEQ Interoffice Memorandum

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TO: Office of the Chief Clerk  
Texas Commission on Environmental Quality

THRU: Chris Kozlowski, Team Leader  
Water Rights Permitting Team

FROM: Sarah Henderson, Project Manager  
Water Rights Permitting Team

DATE: February 3, 2021

SUBJECT: Lower Colorado River Authority  
WRPERM 5731  
CN600253637, RN104090238  
Application No. 5731A to Amend Water Use Permit No. 5731A  
Texas Water Code §§ 11.122, 11.085, Requiring Published and Mailed  
Notice  
Colorado River, Colorado River Basin  
Wharton County

The application and fees were received on December 23, 2020. The application was declared administratively complete and accepted for filing with the Office of the Chief Clerk on February 3, 2021. Published and mailed notice to the water right holders of record within the Colorado River Basin is required pursuant to Title 30 Texas Administrative Code (TAC) § 295.158(b).

All fees have been paid and the application is sufficient for filing.

*Sarah E Henderson*

-----  
Sarah Henderson, Project Manager  
Water Rights Permitting Team  
Water Rights Permitting and Availability Section

OCC Mailed Notice Required  YES  NO

Jon Niermann, *Chairman*  
Emily Lindley, *Commissioner*  
Bobby Janecka, *Commissioner*  
Toby Baker, *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

February 3, 2021

Mr. David Wheelock, P.E.  
Lower Colorado River Authority  
P.O. Box 220, R316  
Austin, TX 78767-0220

VIA E-MAIL

RE: Lower Colorado River Authority  
WRPERM 5731  
CN600253637, RN104090238  
Application No. 14-5731A to Amend Water Use Permit No. 5731  
Texas Water Code §§ 11.122, 11.085, Requiring Published and Mailed Notice  
Colorado River, Colorado River Basin  
Wharton County

Dear Mr. Wheelock:

This acknowledges receipt, on December 23, 2020, of the referenced application and fees in the amount of \$1,266.82 (Receipt Nos. M108676 and M108678, copies attached).

The application was declared administratively complete and filed with the Office of the Chief Clerk on February 3, 2021. Staff will continue processing the application for consideration by the Executive Director.

Please be advised that additional information may be requested during the technical review phase of the application process.

If you have any questions concerning this matter please contact me via email at [sarah.henderson@tceq.texas.gov](mailto:sarah.henderson@tceq.texas.gov) or by telephone at (512) 239-2535.

Sincerely,

*Sarah E Henderson*

Sarah Henderson, Project Manager  
Water Rights Permitting Team  
Water Rights Permitting and Availability Section

Attachments

cc: Ms. Lyn Clancy, LCRA





30-DEC-20 04:13 PM

TCEQ - A/R RECEIPT REPORT BY ACCOUNT NUMBER

*S. Henderson*

<u>Fee Description</u>	<u>Fee Code</u>	<u>Account#</u>	<u>Account Name</u>	<u>Ref#1</u>	<u>Ref#2</u>	<u>Paid In By</u>	<u>Check Number</u>	<u>Card Auth.</u>	<u>User Data</u>	<u>CC Type</u>	<u>Tran Code</u>	<u>Rec Code</u>	<u>Slip Key</u>	<u>Document#</u>	<u>Tran Date</u>	<u>Tran Amount</u>
WTR USE PERMITS	WUP			M108677			10864						BS00084899		30-DEC-20	-\$112.50
	WUP			ADJ103959			123020						D1801879			
	WUP			ROCHELLE, LLOYD GOSSELINK			JARIVERA					CK				
	WUP			M108678			2103693						BS00084899		30-DEC-20	-\$112.50
	WUP			ADJ145731			123020						D1801879			
	WUP			LOWER COLORADO RIVER AUTHORITY			JARIVERA					CK				
<b>Total (Fee Code):</b>																-\$225.00
<b>Grand Total:</b>																-\$12,215.27

**RECEIVED**

JAN 04 2021

Water Availability Division



30-DEC-20 04:13 PM

TCEQ - A/R RECEIPT REPORT BY ACCOUNT NUMBER

*S. Hernandez*  
*P. Hernandez*

<u>Fee Description</u>	<u>Fee Code</u>	<u>Account#</u>	<u>Account Name</u>	<u>Ref#1</u>	<u>Ref#2</u>	<u>Check Number</u>	<u>CC Type</u>	<u>Tran Code</u>	<u>Slip Key</u>	<u>Document#</u>	<u>Tran Date</u>	<u>Tran Amount</u>
NOTICE FEES-WUP-	PTGU			M108676		464365		N	BS00084899		30-DEC-20	-\$1,154.32
WATER USE PERM	PTGU			5731		123020			D1801879			
			NOTICE FEES WUP WATER USE PERMITS	LOWER COLORADO RIVER AUTHORITY		JARIVERA		CK				
<b>Total (Fee Code) :</b>												<b>-\$1,154.32</b>

**RECEIVED**

JAN 04 2021

Water Availability Division



December 22, 2020

**VIA CERTIFIED MAIL**

*Return Receipt Requested*

7017 2680 0000 5086 9315

Ms. Sarah Henderson, MC-160  
TCEQ  
P.O. Box 13087  
Austin, Texas 78711-3087

Re: Lower Colorado River Authority  
CN600253637  
*Application to Amend Water Rights Permit No.5731*  
Colorado River, Colorado River Basin  
Colorado, Matagorda, and Wharton Counties

Dear Ms. Henderson:

Please find one (1) original copy of the Lower Colorado River Authority's application to amend Water Rights Permit No. 5731. An electronic copy of the application has been uploaded to the FTPS site.

A check for **\$112.50** is included for filing and recording fees, and a second check for **\$1,154.32** is enclosed for mailed notice fees.

If you or your staff have any questions or would like additional information, I can be reached by phone at 512-730-6822, or email at [REDACTED].

Sincerely,

A handwritten signature in blue ink that reads "David Wheelock". The signature is fluid and cursive, with a long horizontal stroke at the end.

David Wheelock, P.E.  
Director, Water Supply Planning

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

## TCEQ WATER RIGHTS PERMITTING APPLICATION

### ADMINISTRATIVE INFORMATION CHECKLIST

Complete and submit this checklist for each application. See Instructions Page. 5.

APPLICANT(S): \_\_\_\_\_

Indicate whether the following items are included in your application by writing either Y (for yes) or N (for no) next to each item (all items are not required for every application).

Y/N

- \_\_\_\_\_ **Administrative Information Report**
- \_\_\_\_\_ Additional Co-Applicant Information
- \_\_\_\_\_ Additional Co-Applicant Signature Pages
- \_\_\_\_\_ Written Evidence of Signature Authority
- \_\_\_\_\_ **Technical Information Report**
- \_\_\_\_\_ USGS Map (or equivalent)
- \_\_\_\_\_ Map Showing Project Details
- \_\_\_\_\_ Original Photographs
- \_\_\_\_\_ Water Availability Analysis
- \_\_\_\_\_ **Worksheet 1.0**
- \_\_\_\_\_ Recorded Deeds for Irrigated Land
- \_\_\_\_\_ Consent For Irrigation Land
- \_\_\_\_\_ **Worksheet 1.1**
- \_\_\_\_\_ Addendum to Worksheet 1.1
- \_\_\_\_\_ **Worksheet 1.2**
- \_\_\_\_\_ Addendum to Worksheet 1.2
- \_\_\_\_\_ **Worksheet 2.0**
- \_\_\_\_\_ Additional W.S 2.0 for Each Reservoir
- \_\_\_\_\_ Dam Safety Documents
- \_\_\_\_\_ Notice(s) to Governing Bodies
- \_\_\_\_\_ Recorded Deeds for Inundated Land
- \_\_\_\_\_ Consent For Inundation Land

Y/N

- \_\_\_\_\_ **Worksheet 3.0**
- \_\_\_\_\_ Additional W.S 3.0 for each Point
- \_\_\_\_\_ Recorded Deeds for Diversion Points
- \_\_\_\_\_ Consent For Diversion Access
- \_\_\_\_\_ **Worksheet 4.0**
- \_\_\_\_\_ TPDES Permit(s)
- \_\_\_\_\_ WWTP Discharge Data
- \_\_\_\_\_ 24-hour Pump Test
- \_\_\_\_\_ Groundwater Well Permit
- \_\_\_\_\_ Signed Water Supply Contract
- \_\_\_\_\_ **Worksheet 4.1**
- \_\_\_\_\_ **Worksheet 5.0**
- \_\_\_\_\_ Addendum to Worksheet 5.0
- \_\_\_\_\_ **Worksheet 6.0**
- \_\_\_\_\_ Water Conservation Plan(s)
- \_\_\_\_\_ Drought Contingency Plan(s)
- \_\_\_\_\_ Documentation of Adoption
- \_\_\_\_\_ **Worksheet 7.0**
- \_\_\_\_\_ Accounting Plan
- \_\_\_\_\_ **Worksheet 8.0**
- \_\_\_\_\_ Fees

**For Commission Use Only:**

Proposed/Current Water Right Number: \_\_\_\_\_

Basin: \_\_\_\_\_ Watermaster area Y/N: \_\_\_\_\_

# ADMINISTRATIVE INFORMATION REPORT

The following information is required for all new applications and amendments.

**\*\*\* Applicants are strongly encouraged to schedule a pre-application meeting with TCEQ Staff to discuss Applicant's needs prior to submitting an application. Call the Water Rights Permitting Team to schedule a meeting at (512) 239-4600.**

## 1. TYPE OF APPLICATION (Instructions, Page. 6)

Indicate, by marking X, next to the following authorizations you are seeking.

New Appropriation of State Water

Amendment to a Water Right \*

Bed and Banks

***\*If you are seeking an amendment to an existing water rights authorization, you must be the owner of record of the authorization. If the name of the Applicant in Section 2, does not match the name of the current owner(s) of record for the permit or certificate or if any of the co-owners is not included as an applicant in this amendment request, your application could be returned. If you or a co-applicant are a new owner, but ownership is not reflected in the records of the TCEQ, submit a change of ownership request (Form TCEQ-10204) prior to submitting the application for an amendment. See Instructions page. 6. Please note that an amendment application may be returned, and the Applicant may resubmit once the change of ownership is complete.***

Please summarize the authorizations or amendments you are seeking in the space below or attach a narrative description entitled "Summary of Request."

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**SUMMARY OF REQUEST**  
**[Attached to Administrative Information Report]**  
**LCRA'S APPLICATION TO AMEND WR PERMIT NO. 5731**

The Lower Colorado River Authority (LCRA) was issued Water Rights Permit No. 5731 on April 29, 2011. (A copy of LCRA's Permit No. 5731 is included with Worksheet 2 of the Technical Information Report.) Permit No. 5731 authorizes LCRA to construct a series of off-channel reservoirs within Colorado, Wharton, and Matagorda counties with a maximum combined storage of 500,000 acre-feet, and maximum annual diversion of 853,514 af/yr from the Colorado River and a maximum annual diversion from the storage reservoirs of 327,591 af/yr. Permit No. 5731 includes five authorized diversion points, all of which are authorized diversion points under other LCRA water rights.

Although the permit generally authorizes construction of a series of off-channel reservoirs, Permit No. 5731 does not presently authorize any *specific* off-channel reservoir(s). Instead, Special Condition 6.E(i) ("Reservoir Permitting and Construction") requires that, within 10 years of issuance, and prior to diversion of or impoundment of water under Permit No. 5731, LCRA apply for an amendment to either: (1) authorize specific off-channel reservoir(s); or (b) extend the time for filing an amendment to authorize specific off-channel reservoir(s). Consistent with this special condition, this Amendment application seeks to amend Permit No. 5731 to authorize LCRA's Arbuckle Reservoir as a specific off-channel reservoir in which LCRA may store water diverted under Permit No. 5731. LCRA's Arbuckle Reservoir is already authorized by LCRA's Certificate of Adjudication No. 14-5476C, which authorizes LCRA to construct and maintain an off-channel dam and reservoir impounding up to 52,000 acre-feet of water. The reservoir will store up to 40,000 acre-feet (normal storage). (A copy of Cert. of Adj. No. 14-5476, as amended, is included with Worksheet 2 of the Technical Information Report.) Construction of the reservoir and related facilities is nearing completion.

Diversions of water under Permit No. 5731 for storage in Arbuckle Reservoir under the requested amendment would occur at the location authorized under Paragraph 3.A(iii) of Permit No. 5731, and rely on the existing diversion facilities used by LCRA under Cert. of Adj. No. 14-5476, Paragraph 3.A(1), at a maximum rate of diversion of 561 cfs.

Consistent with Special Condition 6.E(ii) of Permit No. 5731, LCRA has provided information with Worksheet 1.2 (Marshall Factors) and Worksheet 5 (Environmental) of the Technical Information Report (and related Addendums) to address:

- (1) reasonable measures to minimize impacts to aquatic resources due to entrainment and impingement;
- (2) mitigation requirements pursuant to Texas Water Code § 11.152; and
- (3) issues related to the impacts, if any, to water quality or instream flows of any tributaries to the Colorado affected by Arbuckle Reservoir.

Further, consistent with Permit No. 5731's requirements, LCRA has included:

- (1) The results of the Salinity Analysis and related documentation of consultation with the parties to the contested case hearing on LCRA's application for Permit No. 5731 and any comments received from those entities regarding the Salinity Analysis as required by Special Condition 6.C(v)(c)&(d). As set forth in more detail in the Addendum to Worksheet 5 and attachments thereto, the Salinity Analysis demonstrates that no modifications to the special conditions related to freshwater inflows shall be made at this time. (Addendum to Worksheet 5 and attachments thereto.)

- (2) The accounting plan required by Special Condition 6.F, as well as documentation of LCRA's consultation with the parties to the contested case hearing on LCRA's application for Permit No. 5731 and comments received from those entities on the contents of the accounting plan. (Addendum to Worksheet 7 and attachments thereto and Attachment 5 to Addendum to Worksheet 5).

LCRA understands that, pursuant to Special Condition 6.E, this application to amend Permit No. 5731 requires public notice and an opportunity for hearing.

**2. APPLICANT INFORMATION (Instructions, Page. 6 )**

**a. Applicant**

**Indicate the number of Applicants/Co-Applicants \_\_\_\_\_  
(Include a copy of this section for each Co-Applicant, if any)**

What is the Full Legal Name of the individual or entity (applicant) applying for this permit?

*(If the Applicant is an entity, the legal name must be spelled exactly as filed with the Texas Secretary of State, County, or in the legal documents forming the entity.)*

If the applicant is currently a customer with the TCEQ, what is the Customer Number (CN)?  
You may search for your CN on the TCEQ website at

<http://www15.tceq.texas.gov/crpub/index.cfm?fuseaction=cust.CustSearch>

CN : \_\_\_\_\_ ( leave blank if you do not yet have a CN).

What is the name and title of the person or persons signing the application? Unless an application is signed by an individual applicant, the person or persons must submit written evidence that they meet the signatory requirements in 30 TAC § 295.14.

First/Last Name:

Title:

Have you provided written evidence meeting the signatory requirements in 30 TAC § 295.14, as an attachment to this application?

What is the applicant’s mailing address as recognized by the US Postal Service (USPS)? You may verify the address on the USPS website at

<https://tools.usps.com/go/ZipLookupAction!input.action>.

Name:

Mailing Address:

City:

State:

ZIP Code:

Indicate an X next to the type of Applicant:

- |   |   |
|---|---|
| <input type="checkbox"/> Individual         | <input type="checkbox"/> Sole Proprietorship-D.B.A. |
| <input type="checkbox"/> Partnership        | <input type="checkbox"/> Corporation                |
| <input type="checkbox"/> Trust              | <input type="checkbox"/> Estate                     |
| <input type="checkbox"/> Federal Government | <input type="checkbox"/> State Government           |
| <input type="checkbox"/> County Government  | <input type="checkbox"/> City Government            |
| <input type="checkbox"/> Other Government   | <input type="checkbox"/> Other _____                |

For Corporations or Limited Partnerships, provide:

State Franchise Tax ID Number: \_\_\_\_\_ SOS Charter (filing) Number: \_\_\_\_\_



### 3. APPLICATION CONTACT INFORMATION (Instructions, Page. 9)

If the TCEQ needs additional information during the review of the application, who should be contacted? Applicant may submit their own contact information if Applicant wishes to be the point of contact.

First and Last Name:

Title:

Organization Name:

Mailing Address:

City:

State:

ZIP Code:

Phone No.:

Extension:

Fax No.:

E-mail Address;



### 3. APPLICATION CONTACT INFORMATION (Instructions, Page. 9)

If the TCEQ needs additional information during the review of the application, who should be contacted? Applicant may submit their own contact information if Applicant wishes to be the point of contact.

First and Last Name:

Title:

Organization Name:

Mailing Address:

City:

State:

ZIP Code:

Phone No.:

Extension:

Fax No.:

E-mail Address:



## 5. MISCELLANEOUS INFORMATION (Instructions, Page. 9)

a. The application will not be processed unless all delinquent fees and/or penalties owed to the TCEQ or the Office of the Attorney General on behalf of the TCEQ are paid in accordance with the Delinquent Fee and Penalty Protocol by all applicants/co-applicants. If you need assistance determining whether you owe delinquent penalties or fees, please call the Water Rights Permitting Team at (512) 239-4600, prior to submitting your application.

1. Does Applicant or Co-Applicant owe any fees to the TCEQ? **Yes / No**

If **yes**, provide the following information:

Account number:

Amount past due:

2. Does Applicant or Co-Applicant owe any penalties to the TCEQ? **Yes / No**

If **yes**, please provide the following information:

Enforcement order number:

Amount past due:

b. If the Applicant is a taxable entity (corporation or limited partnership), the Applicant must be in good standing with the Comptroller or the right of the entity to transact business in the State may be forfeited. See Texas Tax Code, Subchapter F. Applicant's may check their status with the Comptroller at <https://mycpa.cpa.state.tx.us/coa/>

Is the Applicant or Co-Applicant in good standing with the Comptroller? **Yes / No**

c. The commission will not grant an application for a water right unless the applicant has submitted all Texas Water Development Board (TWDB) surveys of groundwater and surface water use - if required. See TWC §16.012(m) and 30 TAC § 297.41(a)(5).

Applicant has submitted all required TWDB surveys of groundwater and surface water? **Yes / No**

**6. SIGNATURE PAGE (Instructions, Page. 11)**

Applicant:

I, John B. Hofmann Executive VP, Water  
(Typed or printed name) (Title)

certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under Title 30 Texas Administrative Code §295.14 to sign and submit this document and I have submitted written evidence of my signature authority.

Signature: [Handwritten Signature] Date: 12/22/2020  
(Use blue ink)

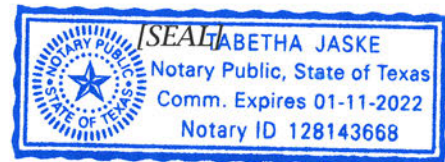
Subscribed and Sworn to before me by the said

on this 22nd day of December, 20 20.

My commission expires on the 11th day of January, 20 22.

Notary Public

TRAVIS  
County, Texas



***If the Application includes Co-Applicants, each Applicant and Co-Applicant must submit an original, separate signature page***

**LCRA Signature Authority:**

**LCRA Board Policy 102**

**LCRA Board Policy 501**

**LCRA Organizational Chart (12-14-2020)**

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## LCRA BOARD POLICY

### 102 – AUTHORITY AND RESPONSIBILITIES

Sept. 21, 2016

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#### 102.10 PURPOSE

This policy defines the relationship between the LCRA Board of Directors and the management of LCRA through the description of responsibilities and expectations and through the establishment of guidelines for the delegation of certain powers and duties.

#### 102.20 POLICY

**102.201 Responsibilities of the Board of Directors.** The Board of Directors (Board) will establish the overall goals and objectives of LCRA, review them on an ongoing basis and adopt Board policies setting forth desired direction of management actions to attain such goals and objectives. The Board will approve an annual business plan that provides funding for the realization of those goals and objectives.

The Board will consider and establish policies in the public interest. The Board will faithfully discharge its public trust by conducting its affairs in a highly moral, ethical and sound business manner. Board members, collectively and severally, will not direct the policies and actions of LCRA from perspectives of private gain or personal advantage.

**102.202 Delegations to the GM/CEO.** The Board of Directors delegates to the GM/CEO all general powers and duties in the LCRA enabling legislation, other applicable law, LCRA bylaws and Board policies necessary to accomplish LCRA's purpose, plans and objectives as approved by the Board, except for those specifically reserved for the Board by provisions of the LCRA enabling legislation, bylaws, Bond resolutions and other Board policies. Notable exceptions include:

- A. Authorization to borrow money or approve bond resolutions.
- B. Approval of agreements related to joint ownership of generating facilities.
- C. Setting rates charged for water and power.
- D. Approval of sale of any real property.
- E. Approval of certain contracts and purchase orders for the acquisition of consulting services, materials, supplies, equipment and related services, in accordance with related Board policies.

The Board will articulate clear and coherent goals and statements of its expectations through its policies and plans.

**102.203 Responsibilities of the GM/CEO.** The GM/CEO, as the chief executive officer of LCRA, is responsible for carrying out the business and activities of LCRA according to state law, the LCRA bylaws, and Board policies.

The GM/CEO may delegate in writing any general powers, duties and related authorities, as deemed appropriate, to officers and staff members.

The GM/CEO is responsible for bringing policy matters to the attention of the Board when its current policies give inadequate direction to LCRA operations or leave LCRA at a disadvantage because of changing conditions. The GM/CEO will provide thorough, well-organized information to the Board in a timely manner. Communications to the Board will be made forthrightly and with candor in the evaluation of the conduct of business and operations of LCRA.

The GM/CEO will ensure appropriate contracting procedures are developed and implemented.

## **102.30 PROCEDURES**

**102.301 Goals and Priorities.** As provided in the bylaws, the GM/CEO each year will present to the Board objectives, goals and priorities for its consideration. These goals will clearly establish the Board's direction in key areas of LCRA affairs.

**102.302 Annual Budget.** The GM/CEO will present to the Board an annual business plan that will include operating and capital budgets to carry out the Board's goals and priorities. The business plan will include projections of LCRA's overall financial performance and capital financing plans and describe the projects, programs, and the associated revenues and expenditures for the next fiscal year.

Adoption of the business plan authorizes the GM/CEO to complete work plans and make associated expenditures within budgets as provided for in accordance with Board policies. The GM/CEO will provide quarterly updates that include indicators of performance toward key goals, actual revenues and expenditures compared to budget, future financial performance projections, and status of major capital projects. The resolution adopting the budget will establish the amount that may not be exceeded without Board approval and the guidelines for approving amendments, reallocations or adjustments to the capital and operating budgets.

## **102.40 AUTHORITY**

LCRA enabling legislation, Chapter 8503, Special District Local Laws Code  
LCRA bylaws, sections 3.02, 6.01, 6.02

**EFFECTIVE:** December 1984. Amended Dec. 14, 1989; Oct. 25, 1991; Sept. 22, 1994; Dec. 15, 1999; March 22, 2000; July 1, 2002; Nov. 19, 2003; Dec. 14, 2011; and Sept. 21, 2016.



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## LCRA BOARD POLICY

### 501 – WATER RESOURCES

Aug. 21, 2019

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#### 501.10 PURPOSE

This policy establishes principles and guidelines for implementing LCRA's responsibilities regarding water supply management, planning and development, water conservation, environmental flows, water quality protection, water contracts and rates, and the temporary lowering of LCRA-operated lakes.

#### 501.20 WATER SUPPLY MANAGEMENT, PLANNING AND DEVELOPMENT

**501.201 Water Supply.** LCRA will take initiative in appropriate management, planning, programs and projects to control, store, preserve, use, develop, conserve and manage the water supplies under its jurisdiction. To guide this effort, LCRA will adhere to the following general principles:

1. As a regional water supplier, LCRA will, where practically feasible, cooperate with regional efforts to benefit the Colorado River basin.
2. LCRA will optimize its water supply by managing the water stored in lakes Buchanan and Travis with a basinwide perspective of ensuring firm water supplies are available during an extended drought while continuing to make interruptible supplies available whenever possible. LCRA will achieve this objective, in part, through the development and implementation of its state-approved Water Management Plan.
3. While maximizing the potential supplies available from its Colorado River rights in a cost-effective manner, LCRA may consider development of new, cost-effective supplies to serve its customers.
4. LCRA will monitor developments in state water law and water rights permitting and, where necessary, take action to ensure the legal rights and obligations LCRA has to manage the state's water resources are not significantly and adversely affected by such activities.
5. LCRA will stay fully apprised of developments regarding the legal framework under which groundwater is regulated and evaluate LCRA's role and the potential impacts to LCRA. Through ongoing assessments of groundwater supplies, LCRA will encourage and research conjunctive management and use of groundwater and surface water supplies. LCRA may plan, develop and manage groundwater and

conjunctive use projects where economically feasible and supported by sound science.

6. LCRA will explore opportunities to improve the reliability of water supply for agricultural needs through diverse, cost-effective strategies that increase available supply in the lower basin while minimizing the impact on firm water customers.
7. A preference for a basinwide approach to benefit both upstream and downstream interests will be given when pursuing water supply strategies.

**501.202 Public Engagement.** LCRA will provide information to the public about plans for future water supply projects and will solicit feedback from the public in the decision-making process. LCRA's public engagement process may include the use of one or more of the following: advisory committees, community forums, town hall meetings or open houses, newspaper advertisements, dedicated webpages, online feedback forms, and other strategies, as appropriate, in addition to any applicable regulatory agency-required public process. The scope and details of LCRA's public engagement process for any proposed project will depend on the size and nature of the proposed project.

For any new water supply project that is expected to create 10,000 acre-feet or more per year, staff will, at a minimum:

- Meet with stakeholder groups and, as appropriate, individuals to provide information about the proposed project, answer questions and solicit input.
- Create a dedicated webpage designed to educate the public about the proposed project and to solicit input from stakeholders and other interested participants. The webpage will provide information relevant to the proposed project, including meeting presentations, participant comments and LCRA's responses, and appropriate technical information.
- Provide periodic progress reports to the Water Operations Committee in public meetings of the committee, including reports on feedback and input received from the public.

Nothing in this policy shall be construed as requiring the disclosure of information that is protected under Texas open government laws.

### **501.30 WATER CONSERVATION**

LCRA will meet or exceed state water conservation requirements and provide leadership in promoting the conservation of water. LCRA's commitment to conserving water will be achieved by implementing a variety of programs designed to encourage the conservation of water.

## **501.40 ENVIRONMENTAL FLOWS**

LCRA is committed to maintaining, and where reasonably possible, improving fish, wildlife and recreation resources in the river and bay system. LCRA will continue to be a leader in developing high-quality science on environmental flows for the benefit of the lower Colorado River basin and comply with all state and federal requirements in the most efficient way possible. LCRA will provide water to help meet environmental flow needs in a manner that does not diminish or hamper its ability to meet current and future water demands of other beneficial users in the basin.

## **501.50 WATER QUALITY PROTECTION**

LCRA will provide leadership in protecting water quality and, where reasonably possible, improving the quality of the surface water and groundwater within the lower Colorado River watershed. LCRA will seek to protect against degradation of water quality and will support recreation, aquatic life and water supply uses of the waters under its jurisdiction. LCRA will implement this goal through monitoring, assessment, advocacy, contracting, regulatory oversight, and reliance on the best available science, technology and innovation. LCRA will cooperate with other concerned public and private entities to help address issues of concern related to water quality within the lower Colorado River watershed, including groundwater.

## **501.60 WATER CONTRACTS AND RATES**

**501.601 Water Contracts.** LCRA will develop reasonable rules for the consideration, issuance and administration of raw water contracts. Such rules should address requirements for water conservation, drought contingency, interbasin transfers, water quality impacts, and other requirements necessary for the fair and appropriate administration of water contracts. The rules should be updated from time to time to reflect changes to Board policy, applicable law or other business needs. LCRA staff will develop standard form raw water contracts consistent with Board policies and rules.

**501.602 Water Rates.** LCRA's rates will be just and reasonable, not unduly discriminatory, and set to fully recover LCRA's costs to control, store, preserve, conserve, use, plan, develop, manage, distribute and sell the water supplies under its jurisdiction, consistent with state law. The rates will be designed to allow LCRA to be self-supporting in providing these services and with the goal of providing for a stable and predictable flow of revenue.

**501.603 Board Consideration and Public Input.** Implementation of new rates will be carried out within a time frame that attempts to minimize adverse impacts upon the customers of LCRA. All contract rules and rates will be presented to the LCRA Board of Directors for approval, and the public, including all water customers, will be afforded an opportunity to comment on such actions prior to the Board's consideration for approval.

## **501.70            LOWERING LCRA-OPERATED LAKES**

The general manager may authorize the temporary lowering of Inks Lake, Lake LBJ, Lake Marble Falls and Lake Austin only if such lowering will not interfere with LCRA's essential operations, unreasonably impact aquatic habitat, or result in any unrecovered losses related to water supply and are otherwise consistent with LCRA's water rights and existing contracts and leases. Further, such lowerings will not result in any unreasonable losses related to hydro-generation revenues for any lowering of Lake Austin or any lowering of Inks Lake, Lake LBJ or Lake Marble Falls that occurs with a frequency of more than once every four years.

## **501.80            AUTHORITY**

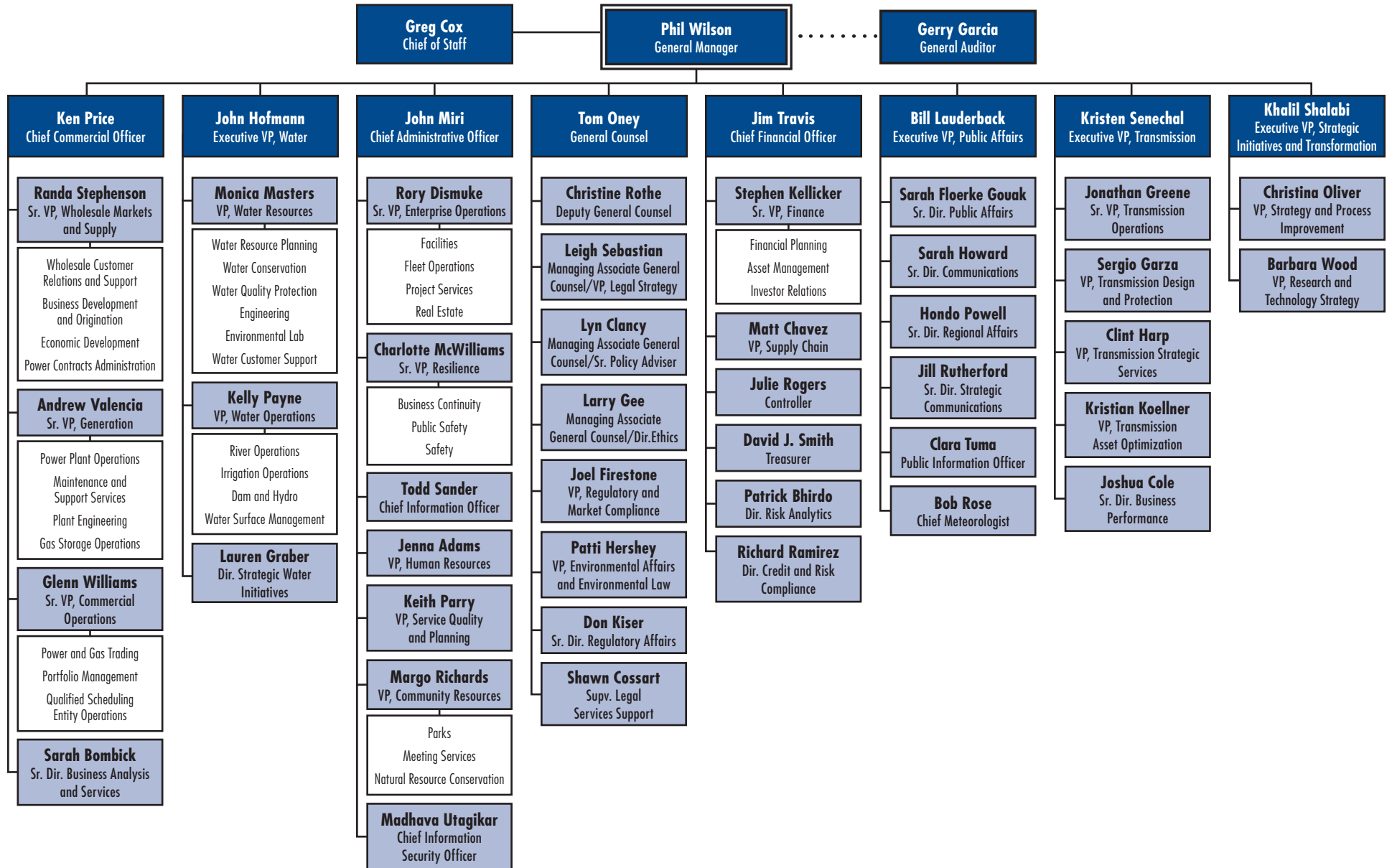
Texas Water Code, chapters 11 and 12

Texas Special District Local Laws Code §§ 8503.001, 8503.004, 8503.0105, 8503.011, 8503.012, 8503.013, 8503.028, 8503.029 and 8503.030

**EFFECTIVE:** Dec. 15, 2010. Amended Sept. 21, 2016; and Aug. 21, 2019.

# LCRA Organizational Overview

Updated Dec. 14, 2020



# TECHNICAL INFORMATION REPORT

## WATER RIGHTS PERMITTING

This Report is required for applications for new or amended water rights. Based on the Applicant's responses below, Applicant are directed to submit additional Worksheets (provided herein). A completed Administrative Information Report is also required for each application.

***Applicants are strongly encouraged to schedule a pre-application meeting with TCEQ Permitting Staff to discuss Applicant's needs and to confirm information necessary for an application prior to submitting such application. Please call Water Availability Division at (512) 239-4600 to schedule a meeting.*** Applicant attended a pre-application meeting with TCEQ Staff for this Application? Y / N Yes (If yes, date : 12/3/2020).

### 1. New or Additional Appropriations of State Water. Texas Water Code (TWC) § 11.121 (Instructions, Page. 12)

**State Water is:** *The water of the ordinary flow, underflow, and tides of every flowing river, natural stream, and lake, and of every bay or arm of the Gulf of Mexico, and the storm water, floodwater, and rainwater of every river, natural stream, canyon, ravine, depression, and watershed in the state. TWC § 11.021.*

- a. Applicant requests a new appropriation (diversion or impoundment) of State Water? Y / N No
- b. Applicant requests an amendment to an existing water right requesting an increase in the appropriation of State Water or an increase of the overall or maximum combined diversion rate? Y / N No (If yes, indicate the Certificate or Permit number: N/A)

*If Applicant answered yes to (a) or (b) above, does Applicant also wish to be considered for a term permit pursuant to TWC § 11.1381? Y / N N/A*

- c. Applicant requests to extend an existing Term authorization or to make the right permanent? Y / N No (If yes, indicate the Term Certificate or Permit number: N/A)

*If Applicant answered yes to (a), (b) or (c), the following worksheets and documents are required:*

- **Worksheet 1.0 – Quantity, Purpose, and Place of Use Information Worksheet**
- **Worksheet 2.0 - Impoundment/Dam Information Worksheet** (submit one worksheet for each impoundment or reservoir requested in the application)
- **Worksheet 3.0 - Diversion Point Information Worksheet** (submit one worksheet for each diversion point and/or one worksheet for the upstream limit and one worksheet for the downstream limit of each diversion reach requested in the application)
- **Worksheet 5.0 – Environmental Information Worksheet**
- **Worksheet 6.0 – Water Conservation Information Worksheet**
- **Worksheet 7.0 – Accounting Plan Information Worksheet**
- **Worksheet 8.0 – Calculation of Fees**
- **Fees calculated on Worksheet 8.0 – see instructions Page. 34.**
- **Maps – See instructions Page. 15.**
- **Photographs - See instructions Page. 30.**

*Additionally, if Applicant wishes to submit an alternate source of water for the project/authorization, see Section 3, Page 3 for Bed and Banks Authorizations (Alternate sources may include groundwater, imported water, contract water or other sources).*

**Additional Documents and Worksheets may be required (see within).**

## 2. Amendments to Water Rights. TWC § 11.122 (Instructions, Page. 12)

This section should be completed if Applicant owns an existing water right and Applicant requests to amend the water right. *If Applicant is not currently the Owner of Record in the TCEQ Records, Applicant must submit a Change of Ownership Application (TCEQ-10204) prior to submitting the amendment Application or provide consent from the current owner to make the requested amendment. If the application does not contain consent from the current owner to make the requested amendment, TCEQ will not begin processing the amendment application until the Change of Ownership has been completed and will consider the Received Date for the application to be the date the Change of Ownership is completed. See instructions page. 6.*

Water Right (Certificate or Permit) number you are requesting to amend: WRPERM 5731

Applicant requests to sever and combine existing water rights from one or more Permits or Certificates into another Permit or Certificate? **Y / N** No (if yes, complete chart below):

List of water rights to sever	Combine into this ONE water right

- a. Applicant requests an amendment to an existing water right to increase the amount of the appropriation of State Water (diversion and/or impoundment)? **Y / N** No

*If yes, application is a new appropriation for the increased amount, complete **Section 1 of this Report (PAGE. 1) regarding New or Additional Appropriations of State Water.***

- b. Applicant requests to amend existing Term authorization to extend the term or make the water right permanent (remove conditions restricting water right to a term of years)? **Y / N** No

*If yes, application is a new appropriation for the entire amount, complete **Section 1 of this Report (PAGE. 1) regarding New or Additional Appropriations of State Water.***

- c. Applicant requests an amendment to change the purpose or place of use or to add an additional purpose or place of use to an existing Permit or Certificate? **Y / N** No

*If yes, submit:*

- **Worksheet 1.0 – Quantity, Purpose, and Place of Use Information Worksheet**
- **Worksheet 1.2 - Notice: “Marshall Criteria”**

- d. Applicant requests to change: diversion point(s); or reach(es); or diversion rate? **Y / N** No  
*If yes, submit:*

- **Worksheet 3.0 - Diversion Point Information Worksheet** (submit one worksheet for each diversion point or one worksheet for the upstream limit and one worksheet for the downstream limit of each diversion reach)
- **Worksheet 5.0 – Environmental Information** (Required for any new diversion points that are not already authorized in a water right)

- e. Applicant requests amendment to add or modify an impoundment, reservoir, or dam? **Y / N** Yes

*If yes, submit: **Worksheet 2.0 - Impoundment/Dam Information Worksheet** (submit one worksheet for each impoundment or reservoir)*

- f. Other - Applicant requests to change any provision of an authorization not mentioned above? **Y / N**No \_\_\_\_\_ *If yes, call the Water Availability Division at (512) 239-4600 to discuss.*

**Additionally, all amendments require:**

- **Worksheet 8.0 – Calculation of Fees; and Fees calculated – see instructions Page. 34**
- **Maps – See instructions Page. 15.**
- **Additional Documents and Worksheets may be required (see within).**

### **3. Bed and Banks. TWC § 11.042 (Instructions, Page 13)**

- a. Pursuant to contract, Applicant requests authorization to convey, stored or conserved water to the place of use or diversion point of purchaser(s) using the bed and banks of a watercourse? TWC § 11.042(a). **Y/N**No \_\_\_\_\_

*If yes, submit a signed copy of the Water Supply Contract pursuant to 30 TAC §§ 295.101 and 297.101. Further, if the underlying Permit or Authorization upon which the Contract is based does not authorize Purchaser's requested Quantity, Purpose or Place of Use, or Purchaser's diversion point(s), then either:*

- 1. Purchaser must submit the worksheets required under Section 1 above with the Contract Water identified as an alternate source; or*
- 2. Seller must amend its underlying water right under Section 2.*

- b. Applicant requests to convey water imported into the state from a source located wholly outside the state using the bed and banks of a watercourse? TWC § 11.042(a-1). **Y / N**No

*If yes, submit: worksheets 1.0, 2.0, 3.0, 4.0, 5.0, 7.0, 8.0, Maps and fees from the list below.*

- c. Applicant requests to convey Applicant's own return flows derived from privately owned groundwater using the bed and banks of a watercourse? TWC § 11.042(b). **Y / N**No

*If yes, submit: worksheets 1.0, 2.0, 3.0, 4.0, 5.0, 7.0, 8.0, Maps, and fees from the list below.*

- d. Applicant requests to convey Applicant's own return flows derived from surface water using the bed and banks of a watercourse? TWC § 11.042(c). **Y / N**No

*If yes, submit: worksheets 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, Maps, and fees from the list below.*

***\*Please note, if Applicant requests the reuse of return flows belonging to others, the Applicant will need to submit the worksheets and documents under Section 1 above, as the application will be treated as a new appropriation subject to termination upon direct or indirect reuse by the return flow discharger/owner.***

- e. Applicant requests to convey water from any other source, other than (a)-(d) above, using the bed and banks of a watercourse? TWC § 11.042(c). **Y / N**No \_\_\_\_\_

*If yes, submit: worksheets 1.0, 2.0, 3.0, 4.0, 5.0, 7.0, 8.0, Maps, and fees from the list below.*

*Worksheets and information:*

- **Worksheet 1.0 – Quantity, Purpose, and Place of Use Information Worksheet**
- **Worksheet 2.0 - Impoundment/Dam Information Worksheet** (submit one worksheet for each impoundment or reservoir owned by the applicant through which water will be conveyed or diverted)
- **Worksheet 3.0 - Diversion Point Information Worksheet** (submit one worksheet for the downstream limit of each diversion reach for the proposed conveyances)
- **Worksheet 4.0 – Discharge Information Worksheet** (for each discharge point)



- **Worksheet 5.0 – Environmental Information Worksheet**
- **Worksheet 6.0 – Water Conservation Information Worksheet**
- **Worksheet 7.0 – Accounting Plan Information Worksheet**
- **Worksheet 8.0 – Calculation of Fees; and Fees calculated – see instructions Page. 34**
- **Maps – See instructions Page. 15.**
- **Additional Documents and Worksheets may be required (see within).**

**4. General Information, Response Required for all Water Right Applications (Instructions, Page 15)**

a. Provide information describing how this application addresses a water supply need in a manner that is consistent with the state water plan or the applicable approved regional water plan for any area in which the proposed appropriation is located or, in the alternative, describe conditions that warrant a waiver of this requirement (*not required for applications to use groundwater-based return flows*). Include citations or page numbers for the State and Regional Water Plans, if applicable. Provide the information in the space below or submit a supplemental sheet entitled “Addendum Regarding the State and Regional Water Plans”:

Designation of LCRA's Arbuckle Reservoir as an authorized reservoir under WRPERM 5731 is consistent with the approved regional and state water plans. The use of off-channel reservoirs, including the Arbuckle Reservoir (formerly known as Lane City Reservoir), is an adopted strategy within those plans. See 2016 Region K Plan, Vol. 2, Section 5.2.3.1.10; 2017 State Water Plan, Ch. 8 & Figure 8.

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b. Did the Applicant perform its own Water Availability Analysis? Y / N No

*If the Applicant performed its own Water Availability Analysis, provide electronic copies of any modeling files and reports.*

c. Does the application include required Maps? (Instructions Page. 15) Y / N Yes

# WORKSHEET 1.0

## Quantity, Purpose and Place of Use

### 1. New Authorizations (Instructions, Page. 16)

Submit the following information regarding quantity, purpose and place of use for requests for new or additional appropriations of State Water or Bed and Banks authorizations:

Quantity (acre- feet) <i>(Include losses for Bed and Banks)</i>	State Water Source (River Basin) or Alternate Source <i>*each alternate source (and new appropriation based on return flows of others) also requires completion of Worksheet 4.0</i>	Purpose(s) of Use	Place(s) of Use <i>*requests to move state water out of basin also require completion of Worksheet 1.1 Interbasin Transfer</i>

\_\_\_\_\_ Total amount of water (in acre-feet) to be used annually (*include losses for Bed and Banks applications*)

If the Purpose of Use is Agricultural/Irrigation for any amount of water, provide:

a. Location Information Regarding the Lands to be Irrigated

i) Applicant proposes to irrigate a total of \_\_\_\_\_ acres in any one year. This acreage is all of or part of a larger tract(s) which is described in a supplement attached to this application and contains a total of \_\_\_\_\_ acres in \_\_\_\_\_ County, TX.

ii) Location of land to be irrigated: In the \_\_\_\_\_ Original Survey No. \_\_\_\_\_, Abstract No. \_\_\_\_\_.

***A copy of the deed(s) or other acceptable instrument describing the overall tract(s) with the recording information from the county records must be submitted. Applicant's name must match deeds.***

***If the Applicant is not currently the sole owner of the lands to be irrigated, Applicant must submit documentation evidencing consent or other documentation supporting Applicant's right to use the land described.***

***Water Rights for Irrigation may be appurtenant to the land irrigated and convey with the land unless reserved in the conveyance. 30 TAC § 297.81.***

## 2. Amendments - Purpose or Place of Use (Instructions, Page. 12)

- a. Complete this section for each requested amendment changing, adding, or removing Purpose(s) or Place(s) of Use, complete the following:

Quantity (acre-foot)	Existing Purpose(s) of Use	Proposed Purpose(s) of Use*	Existing Place(s) of Use	Proposed Place(s) of Use**

\*If the request is to add additional purpose(s) of use, include the existing and new purposes of use under "Proposed Purpose(s) of Use."

\*\*If the request is to add additional place(s) of use, include the existing and new places of use under "Proposed Place(s) of Use."

*Changes to the purpose of use in the Rio Grande Basin may require conversion. 30 TAC § 303.43.*

- b. For any request which adds Agricultural purpose of use or changes the place of use for Agricultural rights, provide the following location information regarding the lands to be irrigated:
- i. Applicant proposes to irrigate a total of \_\_\_\_\_ acres in any one year. This acreage is all of or part of a larger tract(s) which is described in a supplement attached to this application and contains a total of \_\_\_\_\_ acres in \_\_\_\_\_ County, TX.
  - ii. Location of land to be irrigated: In the \_\_\_\_\_ Original Survey No. \_\_\_\_\_, Abstract No. \_\_\_\_\_.  
***A copy of the deed(s) describing the overall tract(s) with the recording information from the county records must be submitted. Applicant's name must match deeds. If the Applicant is not currently the sole owner of the lands to be irrigated, Applicant must submit documentation evidencing consent or other legal right for Applicant to use the land described.***
- Water Rights for Irrigation may be appurtenant to the land irrigated and convey with the land unless reserved in the conveyance. 30 TAC § 297.81.***
- c. Submit Worksheet 1.1, Interbasin Transfers, for any request to change the place of use which moves State Water to another river basin.
- d. See Worksheet 1.2, Marshall Criteria, and submit if required.
- e. See Worksheet 6.0, Water Conservation/Drought Contingency, and submit if required.

# WORKSHEET 1.1

## INTERBASIN TRANSFERS, TWC § 11.085

Submit this worksheet for an application for a new or amended water right which requests to transfer State Water from its river basin of origin to use in a different river basin. A river basin is defined and designated by the Texas Water Development Board by rule pursuant to TWC § 16.051.

Applicant requests to transfer State Water to another river basin within the State? Y / N\_\_\_\_\_

### **1. Interbasin Transfer Request (Instructions, Page. 20)**

- a. Provide the Basin of Origin. \_\_\_\_\_
- b. Provide the quantity of water to be transferred (acre-feet). \_\_\_\_\_
- c. Provide the Basin(s) and count(y/ies) where use will occur in the space below:  
\_\_\_\_\_

### **2. Exemptions (Instructions, Page. 20), TWC § 11.085(v)**

Certain interbasin transfers are exempt from further requirements. Answer the following:

- a. The proposed transfer, which in combination with any existing transfers, totals less than 3,000 acre-feet of water per annum from the same water right. Y/N\_\_
- b. The proposed transfer is from a basin to an adjoining coastal basin? Y/N\_\_
- c. The proposed transfer from the part of the geographic area of a county or municipality, or the part of the retail service area of a retail public utility as defined by Section 13.002, that is within the basin of origin for use in that part of the geographic area of the county or municipality, or that contiguous part of the retail service area of the utility, not within the basin of origin? Y/N\_\_
- d. The proposed transfer is for water that is imported from a source located wholly outside the boundaries of Texas, except water that is imported from a source located in the United Mexican States? Y/N\_\_

### **3. Interbasin Transfer Requirements (Instructions, Page. 20)**

For each Interbasin Transfer request that is not exempt under any of the exemptions listed above Section 2, provide the following information in a supplemental attachment titled "Addendum to Worksheet 1.1, Interbasin Transfer":

- a. the contract price of the water to be transferred (if applicable) (also include a copy of the contract or adopted rate for contract water);
- b. a statement of each general category of proposed use of the water to be transferred and a detailed description of the proposed uses and users under each category;
- c. the cost of diverting, conveying, distributing, and supplying the water to, and treating the water for, the proposed users (example - expert plans and/or reports documents may be provided to show the cost);

- d. describe the need for the water in the basin of origin and in the proposed receiving basin based on the period for which the water supply is requested, but not to exceed 50 years (the need can be identified in the most recently approved regional water plans. The state and regional water plans are available for download at this website: (<http://www.twdb.texas.gov/waterplanning/swp/index.asp>);
- e. address the factors identified in the applicable most recently approved regional water plans which address the following:
  - (i) the availability of feasible and practicable alternative supplies in the receiving basin to the water proposed for transfer;
  - (ii) the amount and purposes of use in the receiving basin for which water is needed;
  - (iii) proposed methods and efforts by the receiving basin to avoid waste and implement water conservation and drought contingency measures;
  - (iv) proposed methods and efforts by the receiving basin to put the water proposed for transfer to beneficial use;
  - (v) the projected economic impact that is reasonably expected to occur in each basin as a result of the transfer; and
  - (vi) the projected impacts of the proposed transfer that are reasonably expected to occur on existing water rights, instream uses, water quality, aquatic and riparian habitat, and bays and estuaries that must be assessed under Sections 11.147, 11.150, and 11.152 in each basin (*if applicable*). If the water sought to be transferred is currently authorized to be used under an existing permit, certified filing, or certificate of adjudication, such impacts shall only be considered in relation to that portion of the permit, certified filing, or certificate of adjudication proposed for transfer and shall be based on historical uses of the permit, certified filing, or certificate of adjudication for which amendment is sought;
- f. proposed mitigation or compensation, if any, to the basin of origin by the applicant; and
- g. the continued need to use the water for the purposes authorized under the existing Permit, Certified Filing, or Certificate of Adjudication, if an amendment to an existing water right is sought.

## WORKSHEET 1.2

### NOTICE. “THE MARSHALL CRITERIA”

This worksheet assists the Commission in determining notice required for certain **amendments** that do not already have a specific notice requirement in a rule for that type of amendment, and *that do not change the amount of water to be taken or the diversion rate*. The worksheet provides information that Applicant **is required** to submit for such amendments which include changes in use, changes in place of use, or other non-substantive changes in a water right (such as certain amendments to special conditions or changes to off-channel storage). These criteria address whether the proposed amendment will impact other water right holders or the on-stream environment beyond and irrespective of the fact that the water right can be used to its full authorized amount.

*This worksheet is **not required** for Applications in the Rio Grande Basin requesting changes in the purpose of use, rate of diversion, point of diversion, and place of use for water rights held in and transferred within and between the mainstems of the Lower Rio Grande, Middle Rio Grande, and Amistad Reservoir. See 30 TAC § 303.42.*

*This worksheet is **not required** for amendments which are only changing or adding diversion points, or request only a bed and banks authorization or an IBT authorization. However, Applicants may wish to submit the Marshall Criteria to ensure that the administrative record includes information supporting each of these criteria*

#### 1. The “Marshall Criteria” (Instructions, Page. 21)

Submit responses on a supplemental attachment titled “Marshall Criteria” in a manner that conforms to the paragraphs (a) – (g) below:

- a. Administrative Requirements and Fees. Confirm whether application meets the administrative requirements for an amendment to a water use permit pursuant to TWC Chapter 11 and Title 30 Texas Administrative Code (TAC) Chapters 281, 295, and 297. An amendment application should include, but is not limited to, a sworn application, maps, completed conservation plan, fees, etc.
- b. Beneficial Use. Discuss how proposed amendment is a beneficial use of the water as defined in TWC § 11.002 and listed in TWC § 11.023. Identify the specific proposed use of the water (e.g., road construction, hydrostatic testing, etc.) for which the amendment is requested.
- c. Public Welfare. Explain how proposed amendment is not detrimental to the public welfare. Consider any public welfare matters that might be relevant to a decision on the application. Examples could include concerns related to the well-being of humans and the environment.
- d. Groundwater Effects. Discuss effects of proposed amendment on groundwater or groundwater recharge.

- e. State Water Plan. Describe how proposed amendment addresses a water supply need in a manner that is consistent with the state water plan or the applicable approved regional water plan for any area in which the proposed appropriation is located or, in the alternative, describe conditions that warrant a waiver of this requirement. The state and regional water plans are available for download at:  
<http://www.twdb.texas.gov/waterplanning/swp/index.asp>.
- f. Waste Avoidance. Provide evidence that reasonable diligence will be used to avoid waste and achieve water conservation as defined in TWC § 11.002. Examples of evidence could include, but are not limited to, a water conservation plan or, if required, a drought contingency plan, meeting the requirements of 30 TAC Chapter 288.
- g. Impacts on Water Rights or On-stream Environment. Explain how proposed amendment will not impact other water right holders or the on-stream environment beyond and irrespective of the fact that the water right can be used to its full authorized amount.

**Addendum to Worksheet 1.2  
"Marshall Criteria" is included  
with application.**

## **Marshall Criteria [Worksheet 1.2]**

### Administrative Requirements and Fees.

All administrative requirements contained in the TCEQ's administrative rules for amendment applications have been satisfied.

### Beneficial Use.

Water diverted under Permit No. 5731 and stored in LCRA's Arbuckle Reservoir will be used for the beneficial purposes already authorized under Permit No. 5731 (municipal, industrial, and agricultural).

### Public Welfare.

Storage of water diverted under Permit No. 5731 in LCRA's Arbuckle Reservoir is not detrimental to the public welfare. LCRA is already authorized to construct a series of off-channel reservoirs within Colorado, Wharton, and Matagorda counties with a maximum combined storage capacity of up to 500,000 acre-feet of water and a maximum combined surface area of 25,408 acres. Authorizing LCRA's existing Arbuckle reservoir as one of the reservoirs allowed to store water under Permit No. 5731 represents an efficient means for LCRA to use Permit No. 5731 while reducing the impacts that could result from construction of new off-channel reservoir at this time (i.e. acquisition of private property, potential for impacts to aquatic and terrestrial habitat, etc.). As such, this request is not detrimental to the public welfare.

### Groundwater Effects.

Storage of water diverted under Permit No. 5731 in the Arbuckle Reservoir will have no adverse impact on groundwater or groundwater recharge. The lower reaches of the Colorado River are generally considered a gaining stream due to groundwater contribution from the Gulf Coast Aquifer. Arbuckle Reservoir is located near a segment of the Colorado River that is known to get stream contributions of upward seepage from the bounding aquifer. See, e.g. Texas Water Development Board, Report 365, Aquifers of the Gulf Coast of Texas, Chapter 18 entitled "Assessment of Shallow Recharge and Groundwater-Surface Water Interactions for the LSWP Study Region, Central Texas Coast", by Deeds, Kelly, Young and Saunders. Some minimal recharge of the shallow groundwater in the vicinity of the reservoir could occur through the bottom of the reservoir.

### State & Regional Water Plan.

Designation of LCRA's Arbuckle Reservoir as an authorized off-channel reservoir under Permit No. 5731 is consistent with the approved 2016 Region K and 2017 State Water Plans, since use off-channel reservoirs, including the Arbuckle Reservoir (formerly known as the "Lane City Reservoir"), is an adopted strategy within those plans. See 2016 Region K Plan, Vol. 2, § 5.2.3.1.10; 2017 State Water Plan, Ch. 8 & Figure 8.4.



### Waste Avoidance.

Storage of water in Arbuckle Reservoir for subsequent beneficial use in accordance with the terms and conditions contained in Permit No. 5731 will allow LCRA to more efficiently use water to meet customer demands.

LCRA's proposed amendment will avoid waste and achieve water conservation consistent with the terms and conditions of Permit No. 5731, which includes specific special conditions related to water conservation. See Paragraph 4 (Conservation). LCRA's Water Conservation Plan that relates to Permit No. 5731 is available online. The LCRA Raw Water Conservation Plan has been previously provided to TCEQ and is available on LCRA's website: <https://www.lcra.org/wp-content/uploads/2020/01/LCRA-WCP-May2019.pdf>.

Moreover, LCRA has separate drought contingency plans (DCPs) for its firm customers and for its interruptible agricultural customers. The LCRA Firm Water DCP is currently included as Appendix F to the 2020 WMP. <https://www.lcra.org/download/appendix-f-lcra-firm-customer-dcp/?wpdmdl=11929>.

### Impacts on Water Rights or On-stream Environment.

The requested amendment will have no greater effect on water rights or on-stream environment beyond the impacts that would occur under the full authorization allowed by Permit 5731. Although the permit generally authorizes LCRA to construct a series of off-channel reservoirs, LCRA is only seeking to authorize one specific off-channel reservoir as part of this application. The amount of water that LCRA will be able to divert and store within Arbuckle Reservoir under Permit No. 5731 is only a small fraction of the overall amount of water that is authorized for storage and diversion under the permit. Moreover, LCRA will use existing diversion facilities to divert water under Permit 5731 into Arbuckle Reservoir that have diversion capacities far less than the full authorized rate of diversion allowed under Permit 5731.

LCRA's construction of the Arbuckle Reservoir is being conducted pursuant to federal U.S. Army Corps of Engineers Permit No. SWG-2013-00229 (Nationwide Permit Verification), which includes requirements to permanently avoid 0.2 acres of wetland near the project and implement other minimization and mitigation measures to reduce potential impacts to riparian habitat associated with the Colorado River, Jarvis Creek, and an unnamed tributary of Jarvis Creek. The flows of Jarvis Creek are unimpeded by the reservoir. In confirming that the project qualified for authorization under its nationwide permitting program, the Corps concluded that the proposed project would have no more than minimal adverse environmental effect. Further, the required Salinity Analysis indicates that the inflow criteria contained in Permit 5731 remain sufficient to address freshwater inflow needs for the bay. (See Worksheet 5 and Addendum to Worksheet 5 and attachments thereto).

# WORKSHEET 2.0

## Impoundment/Dam Information

This worksheet is **required** for any impoundment, reservoir and/or dam. Submit an additional Worksheet 2.0 for each impoundment or reservoir requested in this application.

*If there is more than one structure, the numbering/naming of structures should be consistent throughout the application and on any supplemental documents (e.g. maps).*

### 1. Storage Information (Instructions, Page. 21)

- a. Official USGS name of reservoir, if applicable: J. Scott Arbuckle Reservoir
- b. Provide amount of water (in acre-feet) impounded by structure at normal maximum operating level: 40,000 AF.
- c. The impoundment is on-channel \_\_\_\_\_ or off-channel <sup>off-channel</sup> (mark one)
  - i. Applicant has verified on-channel or off-channel determination by contacting Surface Water Availability Team at (512) 239-4600? Y / N Y
  - ii. If on-channel, will the structure have the ability to pass all State Water inflows that Applicant does not have authorization to impound? Y / N \_\_\_\_\_
- d. Is the impoundment structure already constructed? Y / N Y
  - i. For already constructed **on-channel** structures: Not Applicable - off-channel
    1. Date of Construction: \_\_\_\_\_
    2. Was it constructed to be an exempt structure under TWC § 11.142? Y / N \_\_\_\_\_
      - a. If Yes, is Applicant requesting to proceed under TWC § 11.143? Y / N \_\_\_\_\_
      - b. If No, has the structure been issued a notice of violation by TCEQ? Y / N \_\_\_\_\_
    3. Is it a U.S. Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service (SCS)) floodwater-retarding structure? Y / N \_\_\_\_\_
      - a. If yes, provide the Site No. \_\_\_\_\_ and watershed project name \_\_\_\_\_;
      - b. Authorization to close "ports" in the service spillway requested? Y / N \_\_\_\_\_
  - ii. For **any** proposed new structures or modifications to structures: Amendment to add existing structure to different permit.
    1. Applicant **must** contact TCEQ Dam Safety Section at (512) 239-0326, *prior to submitting an Application*. Applicant has contacted the TCEQ Dam Safety Section regarding the submission requirements of 30 TAC, Ch. 299? Y / N Y  
Provide the date and the name of the Staff Person Travis Wilmer, 6/11/2020
    2. As a result of Applicant's consultation with the TCEQ Dam Safety Section, TCEQ has confirmed that:
      - a. No additional dam safety documents required with the Application. Y / N Y
      - b. Plans (with engineer's seal) for the structure required. Y / N N/A
      - c. Engineer's signed and sealed hazard classification required. Y / N N/A
      - d. Engineer's statement that structure complies with 30 TAC, Ch. 299 rules required. Y / N N/A



## **Worksheet 2**

### **Attachment 1:**

### **Inundated Area Deeds**

## **Worksheet 2**

### **Attachment 2:**

#### **General Location Map**

LCRA Water Rights Amendment  
June 2020

**Legend**

- LCRA Pumping Plant
- ▭ LCRA Lower Basin Reservoir Property Boundary
- ▭ Arbuckle Reservoir
- ▭ LCRA Gulf Coast Water Division Service Area
- ▲ LCRA Water Right Diversion Point

LCRA Gulf Coast  
Diversion Point 1

Lat 29.19510 N  
Long -96.042649 W

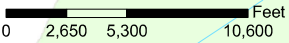
Wharton  
County

Matagorda  
County

LCRA Gulf Coast  
Diversion Point 2

LCRA Gulf Coast  
Diversion Point 3

Bay City

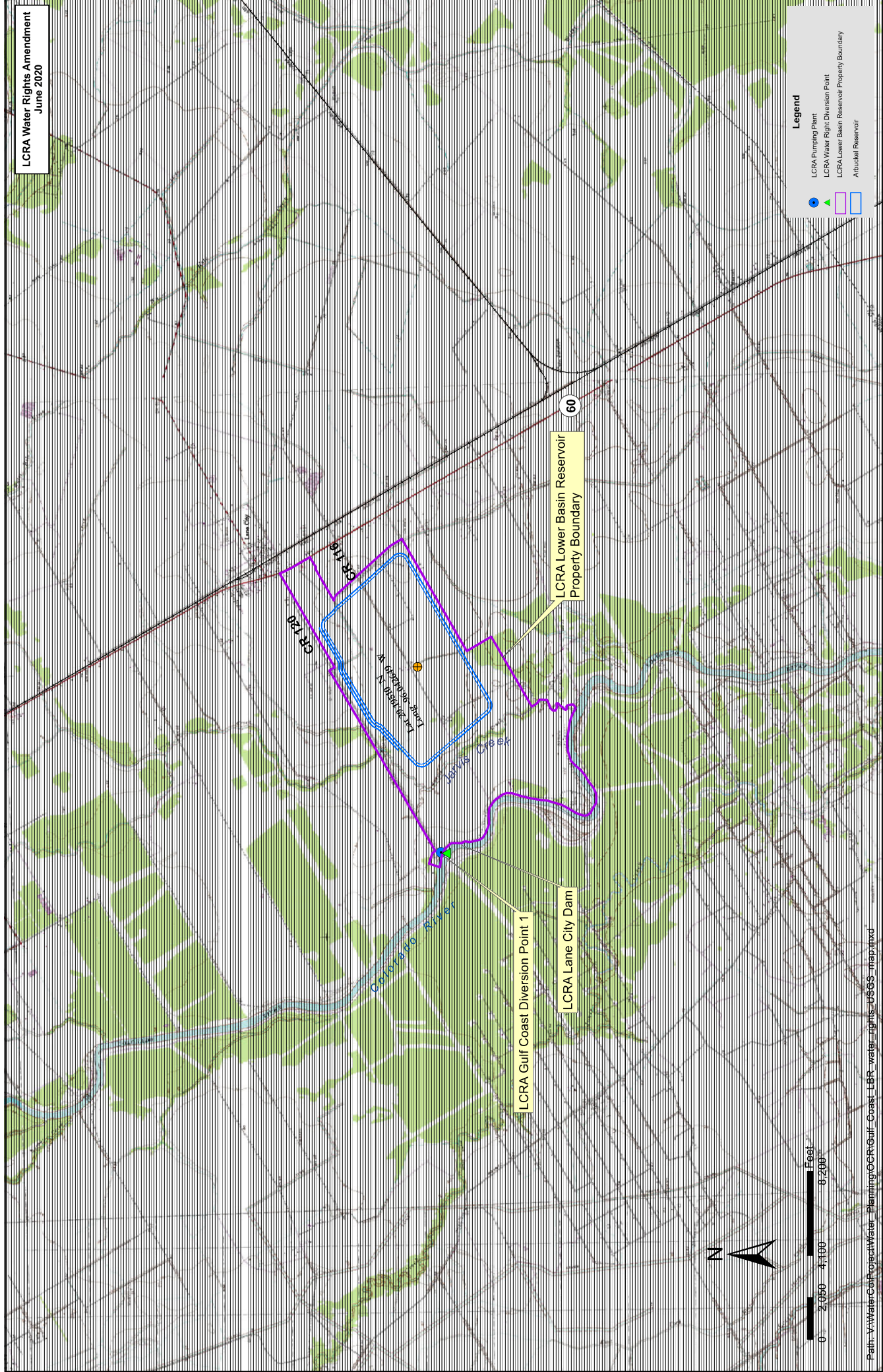


**Worksheet 2**

**Attachment 3:**

**Quad Map**





**Legend**

- LCRA Pumping Plant
- LCRA Water Right Diversion Point
- LCRA Lower Basin Reservoir Property Boundary
- Atbuckel Reservoir

0 2,050 4,100 8,200 Feet





## **Worksheet 2**

### **Attachment 4:**

**WRPERM 5731 (issued 4-29-2011)**

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



## TCEQ DOCKET NO. 2006-1819-WR WATER USE PERMIT

APPLICATION NO. 5731	PERMIT NO. 5731	TYPES §§11.121, 11.085
Owner:	Lower Colorado River Authority	Address: P.O. Box 220 Austin, Texas 78767
Filed:	February 28, 2001	Granted: <b>APR 29 2011</b>
Purpose:	Municipal, Industrial, and Agricultural	Counties: Colorado, Wharton, Matagorda
Watercourse:	Colorado River	Watershed: Colorado River Basin, Brazos River Basin, Lavaca River Basin, Brazos-Colorado Coastal Basin, and Colorado-Lavaca Coastal Basin

WHEREAS, the Lower Colorado River Authority (LCRA), applicant, seeks authorization to divert, store, and use those excess flood waters and those unappropriated flows of the Colorado River Basin downstream of O.H. Ivie Reservoir and downstream of Lake Brownwood in an amount not to exceed 853,514 acre-feet of water per year; and

WHEREAS, the applicant seeks to divert and use the requested appropriation of water at nine existing diversion points downstream of the USGS Gage 08161000, Colorado River at Columbus, Texas, in Colorado County at a maximum combined diversion rate of 40,000 cfs; and

WHEREAS, the applicant seeks to construct an unspecified number of off-channel reservoirs within Colorado, Wharton, and Matagorda Counties with a maximum combined storage capacity of 500,000 acre-feet of water and maximum combined surface area of 25,408 acres; and

WHEREAS, in order to estimate the maximum total surface area of the reservoir, the maximum evaporative losses from the reservoirs, and the maximum total yield from the reservoirs, the applicant indicates that for those purposes assumptions were made

that at the maximum normal operating level of the reservoirs the approximate depth of the reservoirs would be no more than 45 feet and no less than 20 feet; and

WHEREAS, the applicant indicates that the estimated combined maximum annual evaporation from the off-channel reservoirs would be 82,264 acre-feet of water, based on a maximum surface area estimated of the reservoirs and assuming an approximate water depth of 20 feet in the reservoirs. The maximum combined annual diversion of water from the off-channel reservoirs would not exceed 327,591 acre-feet of water based on an assumed maximum approximate water depth of 45 feet within the reservoirs, at the maximum normal operating level, with a maximum combined diversion rate from the off-channel reservoirs of 4,000 cfs (1,795,200 gpm). The applicant estimates that the maximum monthly demand from the off-channel reservoirs would be 110,000 acre-feet based on an assumed capability of diverting one third of the annual total of 327,591 acre-feet in a single month; and

WHEREAS, the applicant is seeking authorization to use the water requested in this application anywhere within its authorized water service area within the Colorado River Basin, Brazos River Basin, Lavaca River Basin, Brazos-Colorado Coastal Basin, and the Colorado-Lavaca Coastal Basin and/or such other areas that hereinafter may be authorized by law for municipal, industrial, and agricultural purposes; and

WHEREAS, this application is subject to the Texas Coastal Management Program (CMP) and must be consistent with the CMP goals and policies; and

WHEREAS, the Texas Commission on Environmental Quality finds that jurisdiction over the application is established; and

WHEREAS, the Executive Director recommends special conditions be added for the protection of instream uses and beneficial inflows; and

WHEREAS, the applicant requests that a special condition be included to address the priority of this right in relation to Colorado River Municipal Water District and Brown County Water Improvement District No. 1 in accordance with LCRA's existing agreements with the districts; and

WHEREAS, the Texas Parks and Wildlife Department, Coastal Conservation Association, Matagorda Bay Foundation, National Wildlife Federation, Sierra Club, STP Nuclear Operating Company, and the City of Austin (collectively the "Protesting Parties") were granted a contested case hearing on the application; and

WHEREAS, as a result of negotiations with the Protesting Parties, applicant has agreed to a reduction in the number of authorized diversion points from nine to five diversion points, to a reduction of the maximum combined diversion rate from 40,000 cfs to 10,000 cfs, and to the inclusion of several terms and conditions, particularly those related to instream flows and beneficial inflows; and

WHEREAS, the Texas Commission on Environmental Quality finds that the issuance of the permit is consistent with the goals and policies of the Texas CMP; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Commission on Environmental Quality in issuing this permit;

NOW, THEREFORE, Water Use Permit No. 5731 is issued to the Lower Colorado River Authority subject to the following terms and conditions:

1. IMPOUNDMENTS

Permittee is authorized to construct a series of off-channel reservoirs within Colorado, Wharton, and Matagorda Counties with a maximum combined storage capacity of 500,000 acre-feet of water and a maximum combined surface area of 25,408 acres.

2. USE

Permittee is authorized to divert an amount not to exceed 853,514 acre-feet of water per year from five diversion points described herein for storage in the off-channel reservoirs and subsequent diversion of a maximum of 327,591 acre-feet of water per year from those reservoirs for use anywhere within Permittee's currently authorized water service area within the Colorado River Basin, Brazos River Basin, Lavaca River Basin, Brazos-Colorado Coastal Basin, and the Colorado-Lavaca Coastal Basin for municipal, industrial, and agricultural purposes.

3. DIVERSION

A. Permittee is authorized to divert from the following authorized existing diversion points downstream of the USGS Gage 08161000, Colorado River at Columbus, Texas:

- (i) At a point of the west bank of the Colorado River in the Samuel Kennelly Grant, Abstract 30, Colorado County, also being Latitude 29.515322°N and Longitude -96.408604°W, and authorized in Certificate of Adjudication No. 14-5434C.
- (ii) At a point of the east bank of the Colorado River in the A.W. McLain and James McNair Grant, Abstract 33, Colorado County, also being Latitude 29.569729°N and Longitude -96.401861°W, and authorized in Certificate of Adjudication No. 14-5475.
- (iii) At a point of the east bank of the reservoir on the Colorado River in the Sylvenus Castleman Grant, Abstract 11, Wharton County, also

being Latitude 29.19271°N and Longitude -96.07155°W, and authorized in Certificate of Adjudication No. 14-5476.

- (iv) At a point of the east bank of the reservoir on the Colorado River in the John F. Bowman and Henry Williams Grant, Abstract 9, Matagorda County, also being Latitude 28.983421°N and Longitude -95.999755°W, and authorized in Certificate of Adjudication No. 14-5476.
- (v) At a point of the west bank of the reservoir on the Colorado River in the Thomas Cayce Grant, Abstract 14, Matagorda County, also being Latitude 28.979813°N and Longitude -96.011406°W, and authorized in Certificate of Adjudication No. 14-5476.

B. Maximum combined diversion rate: 10,000 cfs (4,488,300 gpm).

#### 4. CONSERVATION

Permittee shall implement a water conservation plan that continues to provide for the utilization of reasonable practices, techniques and technologies, for each category of authorized use, that reduce or maintain the consumption of water, prevent or reduce the loss or waste of water, improve efficiency in the use of water, and increase the recycling and reuse of water, so that a water supply is made available for future or alternative uses. The practices and technologies used shall be designed to achieve a level of efficiency of use for each category of authorized use that is equal to or greater than the level provided for in Permittee's most recent water conservation plan on file with the Commission as of the date of the issuance of this permit. In selecting practices, techniques, and technologies to be used, Permittee shall consider any appropriate best management practices that are identified in the most recent version of the Water Conservation Best Management Practices Guide produced by the Texas Water Development Board or any successor document. In every wholesale water contract or contract extension or renewal entered into on or after this permit is issued, Permittee shall continue to include a requirement that each successive wholesale customer develop and implement conservation measures consistent with the requirements of this provision. If the customer intends to resell the water, then the contract for resale of the water shall have water conservation requirements so that each successive wholesale customer in the resale of the water is required to implement water conservation measures consistent with the requirements of this provision. Those requirements include insuring that each successive wholesale customer will have a publicly accessible water conservation plan with specific, quantified 5-year and 10-year targets for water savings and will provide publicly accessible reports to the Permittee at five-year intervals summarizing the progress toward meeting those targets.

5. TIME PRIORITY

- A. The time priority for this authorization is February 28, 2001.
- B. This permit is junior in priority to any claim by the Colorado River Municipal Water District (CRMWD) or Brown County Water Improvement District No. 1 (BCWID) on surface waters of the Colorado River watershed imported into or originating in and above O.H. Ivie Reservoir and Lake Brownwood, as well as the existing rights of any other holder of water rights above Lake Brownwood or O.H. Ivie Reservoir and shall not constitute any limitation upon the granting of new permits to CRMWD or BCWID or amendments to existing water rights of the CRMWD consisting of Certificate Nos. 14-1002, as amended, 14-1008, as amended, 14-1012 and 14-1018 and Permits 3676, as amended, 5457, and 5480, or amendments to the existing water right of BCWID consisting of Certificate No. 14-2454 by the Commission for the impoundment, diversion, and use, within the Colorado River watershed, of waters of the Colorado River imported into or originating in or above O.H. Ivie Reservoir and Lake Brownwood.

6. SPECIAL CONDITIONS

- A. Instream Flow Criteria
  - (i) Diversions authorized under this permit at diversion points upstream of USGS Gage 08162000, Colorado River at Wharton, Texas, shall only occur when: (a) streamflow at USGS Gage 08162000, Colorado River at Wharton, Texas is above the applicable flows listed in Table 1; and (b) diversions will not reduce streamflow at USGS Gage 08162000, Colorado River at Wharton, Texas to less than such flows.

**Table 1:** Monthly Instantaneous Instream Flow Criteria at USGS Gage 08162000, Colorado River at Wharton, Texas

Month	Flow (cfs)
January	838
February	906
March	1036
April	1011

May	1397
June	1512
July	906
August	522
September	617
October	749
November	764
December	746

- (ii) Any diversions under this permit at a diversion point located downstream of USGS Gage 08162000, Colorado River at Wharton, Texas, shall be subject to the passage beyond the diversion point of those instream flows identified in Table 1, Special Condition 6.A.(i). The accounting plan shall include provisions establishing a mechanism for assessing compliance with this requirement.

**B. Channel Maintenance**

A qualifying channel maintenance flow event is defined as an event that begins with a flow of at least 27,000 cfs, as measured at USGS Gage 08161000, Colorado River at Columbus, Texas, has a duration of 48 hours, and includes flows below 27,000 cfs that occur within the 48-hour period following the initial 27,000 cfs flow. If a qualifying channel maintenance flow event has not occurred within the last 24 months, and has not been allowed to pass the diversion points, Permittee's diversions during the first 48 hours after the qualifying channel maintenance flow event has reached the diversion point shall not reduce streamflow below the applicable diversion point to less than the equivalent of 27,000 cfs at USGS Gage 08161000, Colorado River at Columbus, Texas. The equivalent flow at each diversion point shall be determined in the accounting plan required by Special Condition 6.F. and include an adjustment for attenuation between the USGS Gage 08161000, Colorado River at Columbus, Texas, and the applicable diversion point.

**C. Beneficial Inflow Criteria**

- (i) Permittee shall only divert when one or more of the Beneficial Inflow Criteria as defined in the following Special Condition 6.C.(ii),

(iii), and (iv) are satisfied. Diversions which are authorized under the specific criteria in Special Condition 6.C.(ii) or 6.C.(iii) are not subject to the limitations included in Special Condition 6.C.(iv).

(ii) Seasonal Inflow Criteria

- (a) Beneficial Inflow Criteria shall be deemed satisfied for purposes of authorizing diversions under this permit, subject to the limitations in Special Condition 6.C.(ii)(b) (Severe Bay Drought), if the seven-day average salinity for the Shellfish Marker B Transect (as defined by Special Condition 6.H) is 23 parts per thousand (ppt) or less and the total Colorado River inflow to Matagorda Bay in the preceding 60 days exceeds the values in Table 2.

**Table 2:** Seasonal Inflow Criteria

Diversions occurring on any day during the months	Minimum preceding 60 day inflow
March, June	365,000 acre-feet
April, May	400,000 acre-feet
July, August, September, October	260,000 acre-feet
November, December, January, February	190,000 acre-feet

(b) Severe Bay Drought

- (1) "Cumulative Salinity Departure" (CSD) shall be calculated as set forth in Special Condition 6.F., Accounting Plan.
- (2) At any time that CSD exceeds 2,200, the Seasonal Inflow Criteria in Special Condition 6.C.(ii)(a) shall not be used to satisfy the Beneficial Inflow Criteria.
- (3) CSD shall be reset to zero if any of the following events occur:



- (A) Total Colorado River inflows into Matagorda Bay for a 90-day period that ends on any day during the following calendar months are greater than or equal to the corresponding values:
    - i.) March-October: 430,000 acre-feet;
    - ii.) November-February: 410,000 acre-feet.
  - (B) The average salinity at the Shellfish Marker B Transect (as defined by Special Condition 6.H) over the preceding 90-day period is 15 ppt or less; or
  - (C) Total Colorado River inflows to Matagorda Bay for the preceding two consecutive 90-day periods are greater than or equal to 310,000 acre-feet for each such period.
- (4) If a CSD reset occurs from a value greater than 2200 as a result of Special Condition 6.C.(ii)(b)(3)(A) or (B), during the 60-day period immediately following the CSD reset, the Beneficial Inflow Criteria may be deemed satisfied using the Seasonal Inflow Criteria in Special Condition 6.C.(ii)(a) only if a Continuing Drought Reset Criterion is also satisfied. The Continuing Drought Reset Criterion is satisfied if the Colorado River inflows to Matagorda Bay during any 30-day period that ends on any day in the following calendar months are greater than or equal to the corresponding values:
- (A) March – October: 135,000 acre-feet;
  - (B) November – February: 105,000 acre-feet.
- (iii) Low-Salinity Condition. If the 24-hour average salinity as calculated in accordance with Special Condition 6.F., Accounting Plan, for the Shellfish Marker B Transect (as defined by Special Condition 6.H) is 5 ppt or less the Beneficial Inflow Criteria shall be deemed satisfied for the following 24 hours for purposes of authorizing diversions under this permit.
- (iv) High-Flow Scalping. If the flow at the diversion point exceeds 6,000 cfs on a daily average basis, the Beneficial Inflow Criteria shall be deemed satisfied for purposes of authorizing diversions under this permit, subject to the following limitations:

- (a) Permittee is authorized to divert, under this permit, on a daily average basis, an amount no greater than the percentages of flow shown in Table 3.

**Table 3:** Authorized diversion amounts under High-Flow Scalping

Status under Permittee's Adopted Drought Contingency Plan	Bay Condition	
	CSD < 3,800	CSD > 3,800
Firm customers have not been asked to implement mandatory restrictions	Divert up to 35% of flow above 6,000cfs	No diversions
Firm customers have been asked to implement mandatory restrictions	Divert up to 60% of flow above 6,000cfs	Divert up to 35% of flow above 6,000cfs

- (b) If a high-flow pulse of at least 8,000 cfs on a daily average basis has not occurred for two consecutive days at USGS Gage 08162000, Colorado River at Wharton, Texas, in the preceding 18 months, diversions as described in Special Condition 6.C.(iv)(a) are authorized only to the extent that diversions do not reduce daily average flow below 8,000 cfs at the diversion point.
- (v) Adjustment to Seasonal Inflow Criteria
  - (a) Permittee shall perform a Salinity Analysis as described in this Special Condition 6.C.(v)(a) within six (6) months after the tenth anniversary after Permittee initiates diversions under this permit.
    - (1) Permittee shall compile a record of the daily salinity for the Shellfish Marker B Transect (as defined by Special Condition 6.H) for the days in which the Seasonal Inflow Criteria in Table 2 under Special Condition 6.C.(ii)(a) were satisfied, with such daily values grouped into the periods March through June, July through October, and November through February. The record shall cover the period from

January 1, 2005 through December 31 of the year prior to the analysis being triggered.

- (2) For each of the periods March through June, July through October, and November through February, Permittee shall calculate the Percentage Exceedance, which shall be the percentage of days that the salinity at Shellfish Marker B Transect (as defined by Special Condition 6.H) exceeded the values in Table 4 out of the days in which the Seasonal Inflow Criteria in Table 2 under Special Condition 6.C.(ii)(a) were satisfied.

**Table 4:** Salinity Trigger for Adjusting Seasonal Inflow Criteria

Period	Salinity
March through June	18.5 ppt
July through October	21.5 ppt
November through February	23 ppt

- (b) The analysis required under Special Condition 6.C.(v)(a) shall be repeated on a recurring basis every 10 years following the tenth anniversary after Permittee initiates diversions under this permit.
- (c) If the submission of a permit amendment application pursuant to Special Condition 6.E. occurs at least 5 years after the issuance of this permit, an initial Salinity Analysis as set out in Special Condition 6.C.(v)(a) shall be undertaken prior to the submission of that permit amendment application.
- (d) Permittee shall provide the Executive Director with the results of any Salinity Analysis required by Special Condition 6.C.(v)(a)(2) or 6.C.(v)(c) and, shall also provide documentation of consultation with all entities named as parties to the contested case hearing on the application for this permit and any comments received from those entities regarding the Salinity Analysis.
- (e) The Commission may adjust the Seasonal Inflow Criteria in

Table 2, Special Condition 6.C.(ii)(a), based on the Salinity Analysis required by this Special Condition 6.C.(v) only if the Percentage Exceedance as described in Special Condition 6.C.(v)(a)(2) for any single period is greater than 30 percent. In making an adjustment, the Commission may reallocate and, if appropriate, increase the Seasonal Inflow Criteria for the individual periods in Table 2 under Special Condition 6.C.(ii)(a) such that the cumulative total of the Seasonal Inflow Criteria does not exceed the cumulative total of the Seasonal Inflow Criteria in the original permit by more than 40,000 acre-feet. For purposes of any such adjustment, the months of March, April, May, and June shall be treated as a single period such that an increase of 20,000 acre-feet in each of those months, for example, would count as an increase in the Seasonal Inflow Criteria of 20,000 acre-feet. Other than an adjustment, if any, associated with consideration of a permit amendment application pursuant to Special Conditions 6.E. and 6.C.(v)(c), adjustments pursuant to this Special Condition shall be made only if Permittee's installed diversion capacity under this permit exceeds 2500 cfs or if total diversions pursuant to this Permit have exceeded 100,000 acre-feet in any calendar month. In determining whether any adjustment to the Seasonal Inflow Criteria is appropriate under this Special Condition, the Commission shall also consider, at minimum:

- (1) the documentation and comments submitted by Permittee pursuant to Special Condition 6.C.(v)(d) of this section; and
  - (2) any changes to the condition of Matagorda Bay, including changes to the configuration of the bay.
- (f) Other than adjustments under Special Condition 6.C.(v)(c), adjustments to the Seasonal Inflow Criteria as a result of this Special Condition 6.C.(v) may be made no more frequently than once every ten (10) years and shall be considered through an expedited public comment process similar to that contemplated by the rules adopted by the Commission to implement Water Code § 11.1471(e-1). Any changes to the Seasonal Inflow Criteria as a result of this process shall be reflected in an amended permit.

D. Riparian Management Plan

Prior to diversions of water authorized by this permit, Permittee shall

develop a Riparian Management Plan (RMP) and submit the plan to the Executive Director for approval. The RMP shall:

- (i) Identify public lands owned by Permittee between Columbus and the lower-most diversion point with significant riparian value; and
- (ii) Outline a plan for maintaining the riparian ecosystem functions of those lands, including provisions for long-term monitoring.

E. Reservoir Permitting and Construction

- (i) Within ten (10) years of the initial issuance of this permit, and prior to diversion of water from the Colorado River pursuant to this permit or impoundment in the off-channel reservoir(s) authorized under this permit, Permittee shall apply for an amendment to this permit to either: (a) authorize specific off-channel reservoir(s); or (b) extend the time for filing an amendment to authorize specific off-channel reservoir(s) as set forth in this section.
- (ii) Any amendment to authorize specific off-channel reservoir(s) shall address, among other relevant issues, reasonable measures to minimize impacts to aquatic resources due to entrainment and impingement; mitigation requirements pursuant to Section 11.152, Tex. Water Code; and issues related to the impacts, if any, to water quality or instream flows of any tributaries to the Colorado River affected by the proposed reservoir(s). At the time these reservoirs are permitted, time limitations for the commencement and completion of construction will be applied.
- (iii) Any application to amend this permit to extend the deadline for filing an amendment to authorize specific off-channel reservoir(s) shall explain: (a) why the amendment to extend the time should be granted; and (b) why the permit should not be cancelled
- (iv) If Permittee has not applied for an amendment to this permit under Special Condition 6.E.(i) above within the specified deadline, Permittee shall abandon the permit.
- (v) Any application for an amendment as described in Special Condition 6.E. shall require public notice and an opportunity to request a contested case hearing. If the Commission denies such an application for an amendment or an extension of time, the Commission may also concurrently determine whether to initiate cancellation proceedings under Texas Water Code, Chapter 11, Subchapter E for all or part of the permit.

F. Accounting Plan

- (i) Permittee shall include with any application under Special Condition 6.E.(i) to amend this Permit to authorize specific off-channel reservoirs a proposed daily accounting plan that includes, at a minimum, the following:
  - (a) An accounting, by priority date and amount, for all water that will be diverted from the Colorado River into the off-channel reservoir(s) authorized under this Permit;
  - (b) An accounting, by date and amount, for all water diverted from the off-channel reservoir(s) authorized under this permit;
  - (c) An accounting, by date and amount, of water allowed to pass downstream to ensure compliance with Special Conditions 6.A., 6.B., and 6.C related to protection of instream flows and beneficial inflows, including, at a minimum;
    - (1) A description of the stage data and rating information Permittee will use to determine compliance with the requirements of this Permit. In determining compliance with requirements under this permit, Permittee may rely on stage data obtained from the gaging station(s) jointly maintained by the U.S. Geological Survey (USGS) and Permittee. If the ratings used to convert stage to flow published by Permittee and the USGS are not identical at the time these requirements are implemented by Permittee, Permittee may exercise its discretion in relying on the latest updated rating of the gage(s).
    - (2) For purposes of determining compliance with Special Condition 6.B. ("Channel Maintenance"), flows in the Colorado River shall be measured at USGS Gage 08161000, Colorado River at Columbus, Texas, and the nearest USGS Gage located upstream of the actual diversion point of water appropriated under this permit, with appropriate adjustments, as set forth in the accounting plan, that account for travel time, downstream diversions, and lateral inflows reasonably estimated by Permittee, pursuant to a method set forth in the accounting plan, to have occurred along the Colorado River downstream of the USGS Gage 08161000, Colorado River at Columbus, Texas, and

upstream of the diversion point(s) used by Permittee.

- (3) For purposes of determining compliance with Special Condition 6.C., (“Beneficial Inflows Criteria”), the plan shall include a description of how Permittee will determine Colorado River inflow to Matagorda Bay, including the circumstances under which Permittee will use flow measured at USGS Gage 08162500, Colorado River near Bay City, Texas, or, when appropriate, at Permittee’s Lane City gage. (Permittee’s Lane City gage is located on the Colorado River, Latitude 29.19028°N and Longitude - 96.0692°W, approximately 3 miles southwest of Lane City, Texas.)
- (d) An accounting of the salinity measurements and calculations necessary to determine compliance with Special Conditions 6.C.(ii), (iii) and (v), subject to the following requirements:
  - (1) Beginning at such time that Permittee initiates diversions under this permit, Permittee shall measure salinity on at least an hourly basis using two salinity monitoring instruments at the West Bay @ Tripod and two salinity monitoring instruments at West Bay @ Shellfish Marker B (as identified under Special Condition 6.H).
  - (2) Instrument Reliability. If the daily average salinity varies by greater than 3 ppt between two instruments at the same location, Permittee shall inspect the instruments and repair or replace the instruments, if necessary, within three business days.
  - (3) The calculation of the average salinity across the Shellfish Marker B Transect (as defined by Special Condition 6.H) shall be as follows:
    - (A) A daily average salinity value shall be calculated for each individual salinity monitoring instrument.
    - (B) The daily average salinity at the West Bay @ Tripod (as identified under Special Condition 6.H) shall be calculated as the average of the daily average salinity for the two salinity instruments at that location; and the daily

average salinity at West Bay @ Shellfish Marker B (as identified under Special Condition 6.H) shall be calculated as the average of the daily average salinity for the two salinity instruments at that location.

- (C) The Shellfish Marker B Transect average salinity shall be calculated as the average of the daily average salinity at the West Bay @ Tripod and West Bay @ Shellfish Marker B locations as such locations are identified under Special Condition 6.H. However, if the salinity instruments at either the West Bay @ Tripod or West Bay @ Shellfish Marker B are outside of the range specified under Special Condition 6.F.(i)(d)(2), the transect salinity shall be established as the daily average salinity at the other location.
  - (D) For purposes of determining the 24-hour average salinity under Special Condition 6.C.(iii), the accounting plan shall specify the time of day at which the 24-hour period begins and ends.
- (e) An accounting of Permittee's calculation of Cumulative Salinity Departure, for purposes of Special Conditions 6.C.(ii)(b) and 6.C.(iv), subject, at a minimum, to the following requirements:
- (1) When average daily salinity at the Shellfish Marker B Transect (as defined by Special Condition 6.H) exceeds 23 ppt, the absolute value of the difference between the salinity value and 23 ppt shall be added to a running total of "Cumulative Salinity Departure" (CSD).
  - (2) When average daily salinity is below 23 ppt, the absolute value of the difference shall be subtracted.
  - (3) If the resulting CSD would otherwise be a negative value, it shall be set to zero.
  - (4) All CSD calculations should be done on a daily basis.
- (ii) Permittee shall file with any submission of a proposed accounting plan or any proposed substantive revision thereof, documentation of consultation with all entities named as parties to the contested case hearing on the application for this permit and of any comments



received from those entities on the contents of the accounting plan. The Executive Director shall consider those comments in determining the adequacy of the accounting plan or any proposed substantive revision.

- (iii) Permittee shall maintain the approved daily accounting plan in electronic format and, except as may be restricted by other local, state, or federal law, make it available to the general public during normal business hours and to the Executive Director upon request.
- (iv) If at any time Permittee intends to store other waters, either from the Colorado River (authorized by other water rights) or from other previously authorized sources, for subsequent storage in and diversion from the off-channel reservoir(s) authorized under this permit, Permittee shall submit, and receive approval by the Executive Director, of a modification to the accounting plan that accounts for those additional waters prior to storing or using such supplies.
- (v) If Permittee seeks to modify its accounting plan, Permittee shall submit a request to the Executive Director for a determination of whether such modification requires a permit amendment, along with copies of the appropriate documents reflecting such modifications. Any modifications to the accounting plan that the Executive Director determines would change the permit terms must be submitted in the form of an application to amend the permit. If a permit amendment is required, Permittee shall not make any diversions pursuant to the modified accounting plan until a permit amendment is issued.
- (vi) Should Permittee fail to maintain the accounting plan, notify the Executive Director of any modifications to the accounting plan, or file an application to amend the Permit, Permittee shall immediately cease all diversions pursuant to this Permit until Permittee corrects the records, or files with the Executive Director the amended plan or, if necessary, application to amend the permit.

#### G. Monitoring and Data Availability

- (i) Monitoring. Upon issuance of this permit, Permittee shall:
  - (a) Implement a program to measure salinity on at least an hourly basis at both the West Bay @ Tripod and West Bay @ Shellfish Marker B;
  - (b) Implement a program to measure salinity on at least an

hourly basis at a representative location approved by the Executive Director within the Colorado River delta; and

(c) Implement a program to obtain salinity data approximately every thirty (30) days at three points along a transect proximate to Mad Island, or on at least an hourly basis at a single location proximate to Mad Island. Permittee shall notify the Executive Director prior to implementing such a program.

(ii) Data Availability

Permittee shall maintain the data and analysis required pursuant to this Permit in electronic format and, except as may be restricted by other local, state, or federal law, make it available to the general public during normal business hours and to the Executive Director upon request.

H. Salinity Measurement Locations

The specific locations to be used for determining salinity as required by Special Conditions 6.C, 6.F, or 6.G are as follows:

- (i) West Bay @ Shellfish Marker B: Latitude 28.6206°N, Longitude -96.0503°W
- (ii) West Bay @ Tripod: Latitude 28.5960°N, Longitude -96.0396°W
- (iii) The Shellfish Marker B Transect is an imaginary line drawn between the West Bay @ Shellfish Marker B and West Bay @ Tripod.

I. Reopener

- (i) Consistent with and subject to the conditions stated in Texas Water Code §11.147(e-1), the Commission may adjust the conditions included in this permit to provide for protection of instream flows or beneficial inflows, if the Commission determines, through an expedited public comment process, that such an adjustment is appropriate to achieve compliance with applicable environmental flow standards adopted under Texas Water Code §11.1471. Nothing in Special Condition 6.C(v) shall limit the Commission's authority under this Special Condition 6.I.(i)
- (ii) Any voluntary adjustments made pursuant to Special Condition 6.C.(v) that increase the Seasonal Inflow Criteria in Table 2, Special Condition 6.C.(ii)(a), shall entitle Permittee to an appropriate credit as determined by the Commission or Executive Director for the benefits of such adjustments as required by Texas Water Code § 11.147 (e-2).

This permit is issued subject to all superior and senior water rights in the Colorado River Basin.

Permittee agrees to be bound by the terms, conditions, and provisions contained herein and such agreement is a condition precedent to the granting of this permit.

All other matters requested in the application which are not specifically granted by this permit are denied.

This permit is issued subject to the Rules of the Texas Commission on Environmental Quality and to the right of continuing supervision of State water resources exercised by the Commission.



For the Commission

Date Issued: APR 29 2011 :

## **Worksheet 2**

### **Attachment 5:**

**Certificate of Adj. No. 14-5476, as amended**

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



## AMENDMENT TO A CERTIFICATE OF ADJUDICATION

CERTIFICATE NO. 14-5476D	TYPE §§ 11.122, 11.042, 11.085
Owner: Lower Colorado River Authority	Address: P.O. Box 220 Austin, Texas 78767
Filed: June 29, 2016	Granted: November 13, 2017
Purposes: Agricultural, Municipal, Industrial, Mining, and Instream	Counties: Wharton and Matagorda
Watercourse: Colorado River	Watershed: Colorado River Basin, Colorado- Lavaca Coastal Basin and Brazos-Colorado Coastal Basin

WHEREAS, Certificate of Adjudication No. 14-5476 authorizes the Lower Colorado River Authority (LCRA) to maintain two existing dams and reservoirs (Lane City Dam and Bay City Dam) on the Colorado River, Colorado River Basin, and impound therein a combined capacity of 1,865 acre-feet of water; and

WHEREAS, LCRA is also authorized to divert and use not to exceed 262,500 acre-feet of water per year from three points on the reservoirs for municipal, industrial, mining and agricultural purposes to irrigate 50,000 acres of land within the LCRA Gulf Coast Water Division Service Area in Matagorda and Wharton Counties in the Colorado River Basin and the Colorado-Lavaca and Brazos-Colorado Coastal Basins; and

WHEREAS, LCRA is also authorized to construct and maintain an off-channel reservoir in Wharton County (Lane City Off-channel Reservoir) and to impound therein up to 52,000 acre-feet of water, including water authorized for diversion under this certificate and any water legally available to LCRA; and to subsequently divert and use this stored water for municipal, industrial, mining, and agricultural purposes; and

WHEREAS, the maximum diversion rate from Diversion Point No. 1 on the Lane City Dam and Reservoir is 561.00 cfs (252,450 gpm), the maximum diversion rate

from Diversion Point No. 2 located on the Bay City Dam and Reservoir is 145.20 cfs (65,340 gpm), and the maximum diversion rate from Diversion Point No. 3 located on the Bay City Dam and Reservoir is 561.00 cfs (252,450 gpm); and

WHEREAS, multiple time priorities and special conditions apply; and

WHEREAS, LCRA seeks to amend Certificate of Adjudication No. 14-5476 to add instream uses as an authorized beneficial use of water appropriated in that Certificate and subsequently released from Lane City Off-channel Reservoir, in particular to help meet freshwater inflow needs into Matagorda Bay, and to add an authorized place of beneficial use of water appropriated in that Certificate and subsequently released from Lane City Off-channel Reservoir in Matagorda Bay generally located at the mouth of the Colorado River (River Mile 6), Latitude 28.676000° N, Longitude 95.976800° W, also bearing S 11.4° E 6,580 feet from the northeast corner of the Stephen F. Austin Survey, Abstract No. 2, 1.5 miles southwest Matagorda City in Matagorda County; and

WHEREAS, LCRA also seeks to amend the service area for water appropriated in Certificate of Adjudication No. 14-5476 to include Matagorda Bay; and

WHEREAS, LCRA also seeks authorization to use the bed and banks of the Colorado River to convey water discharged from Lane City Off-channel Reservoir for subsequent diversion for beneficial uses authorized by the Certificate at any point along the Colorado River where LCRA or its customers have authorized diversion facilities for municipal, industrial, mining, agricultural or instream purposes, and for instream use in Matagorda Bay; and

WHEREAS, the Texas Commission on Environmental Quality finds that jurisdiction over the application is established; and

WHEREAS, the Executive Director recommends that special conditions be included in this amendment; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Commission on Environmental Quality in issuing this amendment;

NOW, THEREFORE, this amendment to Certificate of Adjudication No. 14-5476, designated Certificate of Adjudication No. 14-5476D, is issued to the Lower Colorado River Authority subject to the following terms and conditions:

1. USE

In addition to the previous authorizations, Owner is authorized to use:

- A. Water appropriated in this Certificate for instream uses, subject to the Special Conditions set forth in Paragraph 6.

- B. The bed and banks of the Colorado River from Lane City Dam and Reservoir to the mouth of the Colorado River (Matagorda Bay) to convey water discharged from Lane City Off-channel Reservoir.

2. DISCHARGE

Owner is authorized to discharge water from Lane City Off-channel Reservoir through a man-made channel and thence to the Colorado River at a point located at Latitude 29.192281° N, Longitude 96.070931° W, also bearing N 25° W, 860 feet from the southwest corner of the Sylvanus Castleman Survey, Abstract No. 11 in Wharton County at a maximum discharge rate during normal operations of 450 cfs (202,000 gpm) and a maximum discharge rate through the outfall of 750 cfs when Owner draws down the reservoir in response to an emergency condition related to extreme wind and precipitation events or other dam safety considerations.

3. DIVERSION

In addition to the previous authorizations, and subject to the Special Conditions set forth in Paragraph 6, Owner is authorized to divert or use the water discharged from Lane City Off-channel Reservoir at the following points:

- A. Any point along the Colorado River downstream of the discharge point authorized in Paragraph 2 where LCRA or its customers have authorized diversion facilities for municipal, industrial, agricultural, mining, or instream purposes.
- B. Matagorda Bay, generally near the mouth of the Colorado River (River Mile 6) located at Latitude 28.676000° N, Longitude 95.976800° W, also bearing S 11.4° E, 6,580 feet from the northeast corner of the Stephen F. Austin Survey, Abstract No. 2, 1.5 miles southwest Matagorda City in Matagorda County for instream use.

4. CONSERVATION

Owner shall implement water conservation plans that provide for the utilization of those practices, techniques, and technologies that reduce or maintain the consumption of water, prevent or reduce the loss or waste of water, maintain or improve the efficiency in the use of water, increase the recycling and reuse of water, or prevent the pollution of water, so that a water supply is made available for future or alternative uses. Such plans shall include a requirement that in every wholesale water supply contract entered into on or after the effective date of this amendment, including any contract extension or renewal, that each successive wholesale customer develop and implement conservation measures. If the customer intends to resell the water, then the contract for resale of the water shall have water conservation requirements so that each successive wholesale customer in the resale of the water will be required to implement water conservation measures.

5. TIME PRIORITY

This amendment does not change the time priority of the existing authorizations in the Certificate.

6. SPECIAL CONDITIONS

- A. Use of water for instream uses authorized under Paragraph 1 is limited to use of water stored in Lane City Off-channel Reservoir authorized by Certificate of Adjudication No. 14-5476C and shall not exceed the amounts that, when added to the amount of other water projected to arrive at the location described in Paragraph 3.B, would help meet the monthly and/or relevant maximum seasonal levels of inflow described in the figure set forth in 30 Tex. Admin. Code § 298.330(a) when LCRA is releasing water from the Lane City Off-channel Reservoir to help meet a monthly inflow and/or a spring, fall or intervening season quantity.
- B. The diversion rate of water and, where applied to instream flow, the rate of delivery for use of water at the location described in Paragraph 3.B, is limited to a maximum combined rate not to exceed the rate of water discharged under Paragraph 2 of this Certificate, less conveyance losses to the point(s) of diversion and use.
- C. Owner shall measure and record daily the rate and amount of water discharged into the Colorado River from Lane City Off-channel Reservoir, estimated conveyance losses, and the amounts subsequently diverted and used under Paragraph 3 of this Certificate of Adjudication No. 14-5476D to meet its downstream water supply commitments to customers or used to help meet freshwater inflow needs in Matagorda Bay. Owner shall account for the amount of water used in its annual water use reports to the Commission.
- D. So long as LCRA owns Certificate of Adjudication No. 14-5437, as amended, jointly with the STP Nuclear Operating Company, on behalf of the STP Owners, and except to the extent STP Nuclear Operating Company provides prior and specific written consent, deliveries of water pursuant to this amendment to locations where STP Nuclear Operating Company owns or operates authorized diversion facilities may be made only for purposes of supplying water to STP Nuclear Operating Company consistent with Contractual Permit No. 327A using physical facilities that STP Nuclear Operating Company owns and operates, or that are owned by or operated on behalf of the STP Owners.

This amendment is issued subject to all terms, conditions, and provisions contained in Certificate of Adjudication No. 14-5476, as amended, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Colorado River Basin.



Owner agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Commission on Environmental Quality and to the right of continuing supervision of state water resources exercised by the Commission.

  
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For the Commission

Date Issued: **November 13, 2017**

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



THE STATE OF TEXAS  
COUNTY OF TRAVIS

I hereby certify that this is a true and correct copy of a Texas Commission on Environmental Quality document, which is filed in the permanent records of the Commission. Given under my hand and the seal of office on

*Bridget C. Bohac* FEB 19 2014

Bridget C. Bohac, Chief Clerk  
Texas Commission on Environmental Quality

AMENDMENT TO A  
CERTIFICATE OF ADJUDICATION

CERTIFICATE NO. 14-5476C

Type: 11.122

Owner: Lower Colorado River Authority

Address: P.O. Box 220  
Austin, Texas 78767

Filed: December 13, 2013

Granted: February 13, 2014

Purposes: Agricultural, Municipal,  
Industrial, and Mining

Counties: Wharton and Matagorda

Watercourse: Colorado River

Watershed: Colorado River Basin, Colorado-  
Lavaca Coastal Basin & Brazos-  
Colorado Coastal Basin

WHEREAS, Certificate of Adjudication No. 14-5476 authorizes the Lower Colorado River Authority (LCRA) to maintain two existing dams and reservoirs (Lane City and Bay City Dam) on the Colorado River, Colorado River Basin, and impound therein a combined capacity of 1,865 acre-feet of water; and

WHEREAS, the LCRA is also authorized to divert and use not to exceed 262,500 acre-feet of water per year from three points on the reservoirs for municipal, industrial, mining and agricultural purposes to irrigate 50,000 acres of land within the LCRA Gulf Coast Water Diversion Service Area in Matagorda and Wharton Counties, Texas; and

WHEREAS, the maximum diversion rate from Diversion Point No. 1 on the Lane City Dam and Reservoir is 561.00 cfs (252,450 gpm), the maximum diversion rate from Diversion Point No. 2 located on the Bay City Dam and Reservoir is 145.20 cfs (65,340 gpm), and the maximum diversion rate from Diversion Point No. 3 located on the Bay City Dam and Reservoir is 561.00 cfs (252,450 gpm); and

WHEREAS, multiple time priorities and Special Conditions apply; and

WHEREAS, the LCRA seeks to amend Certificate of Adjudication No. 14-5476 to store water authorized for diversion from the Colorado River, Colorado River Basin by Certificate 14-5476 and other sources into a 52,000 acre-foot off-channel reservoir in Wharton County for subsequent diversion and use; and

WHEREAS, the applicant indicates the off-channel storage will be located at Latitude 29.19510 °N, 96.042949°W Longitude also bearing South 12° of West, 3,000 feet from the northeast corner of the Sylvanus Castleman Survey, Abstract 12, Wharton County; and

WHEREAS, the LCRA also seeks to clarify the extent of the service area to confirm LCRA's authorization to provide water within the Colorado River Basin, as well as the adjacent Brazos-Colorado & Colorado-Lavaca Coastal Basins, within Wharton and Matagorda Counties; and

WHEREAS, the Executive Director recommends Special Conditions be included; and

WHEREAS, the Texas Commission on Environmental Quality finds that jurisdiction over the application is established; and

WHEREAS, no requests for a contested case hearing were received for this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Commission on Environmental Quality in issuing this amendment;

NOW THEREFORE, this amendment to Certificate of Adjudication No. 14-5476, designated Certificate of Adjudication No. 14-5476C, is issued to the Lower Colorado River Authority, subject to the following terms and conditions:

1. IMPOUNDMENT

In addition to previous authorizations, Owner is authorized to construct and maintain an off-channel dam and reservoir impounding up to 52,000 acre-feet of water.

2. USE

A. Permittee is authorized to store water lawfully diverted under this permit in the off-channel reservoir authorized in Paragraph 1 and may subsequently divert and use this stored water for municipal, industrial, mining and agricultural purposes to irrigate 50,000 acres of land within the LCRA Gulf Coast Water Diversion Service Area in Matagorda and Wharton Counties.

B. In lieu of previous authorizations, Owner is now authorized to provide water within the existing service areas covering the Colorado River Basin, Brazos-Colorado Coastal Basin and Colorado-Lavaca Coastal Basin within Wharton and Matagorda Counties.

3. TIME PRIORITY

This amendment does not change the time priority of the existing authorizations.

4. SPECIAL CONDITIONS

A. Within two years and prior to commencement of construction and impoundment of water diverted from the Colorado River, Owner shall either: (a) submit a detailed statement and plans under Texas Water Code §11.144 for alterations and changes to the plans submitted with the application; or (b) file an application to extend the time for submitting a detailed statement and plans modifying the plans submitted with the application under Texas Water Code §11.144. Prior to commencement of construction, final construction plans must be submitted and approved by the Executive Director.

B. Owner may store water available from any source legally available to it, as may be evidenced by an LCRA Board reservation or other legally enforceable obligation, provided the source of water is authorized for diversion from the diversion points in this certificate.

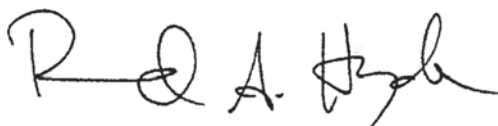
This amendment is issued subject to all terms, conditions and provisions contained in Certificate of Adjudication No. 14-5476, as amended, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Colorado River Basin.

Owner agrees to be bound by the terms, conditions, and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Commission on Environmental Quality and to the right of continuing supervision of State water resources exercised by the Commission.

A handwritten signature in black ink, appearing to read "R. Q. A. Hyle". The signature is written in a cursive style with a horizontal line extending from the end of the name.

For the Commission

Date Issued: February 13, 2014

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



## AMENDMENT TO A CERTIFICATE OF ADJUDICATION

CERTIFICATE NO. 14-5476B

Type: 11.122

Owner: Lower Colorado River Authority      Address: 3700 Lake Austin Blvd.  
Austin, Texas 78703

Filed: August 10, 2011      Granted: September 12, 2011

Purposes: Agricultural, Municipal,  
Industrial and Mining      Counties: Wharton and Matagorda

Watercourse: Colorado River      Watershed: Colorado River Basin

WHEREAS, Certificate of Adjudication No. 14-5476 authorizes the Lower Colorado River Authority (LCRA) to maintain two existing dams and reservoirs (Lane City and Bay City Dam) on the Colorado River, Colorado River Basin and impound therein a combined capacity of 1,865 acre-feet of water; and

WHEREAS, in addition, the LCRA is authorized to divert and use not to exceed 262,500 acre-feet of water per year from three points on the reservoirs for Agricultural purposes to irrigate 50,000 acres of land within the LCRA Gulf Coast Water Diversion Service Area in Matagorda and Wharton Counties, Texas; and

WHEREAS, the maximum diversion rate from Diversion Point 1. on the Lane City Dam and Reservoir is 561.00 cfs (252,450 gpm), the maximum diversion rate from Diversion Point 2. located on the Bay City Dam and Reservoir is 145.20 cfs (65,340 gpm), and the maximum diversion rate from Diversion Point 3 located on the Bay City Dam and Reservoir is 561.00 cfs (252,450 gpm); and

WHEREAS, multiple time priorities and Special Conditions apply; and

WHEREAS, the LCRA seeks to amend Certificate of Adjudication No. 14-5476 to add municipal, industrial, and mining uses; and

WHEREAS, the Texas Commission on Environmental Quality finds that jurisdiction over the application is established; and

WHEREAS, no requests for a contested case hearing were received for this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code

and Rules of the Texas Commission on Environmental Quality in issuing this amendment;

NOW, THEREFORE, this amendment to Certificate of Adjudication No. 14-5476, designated Certificate of Adjudication No. 14-5476B, is issued to Lower Colorado River Authority, subject to the following terms and conditions:

1. USE

In addition to the previous authorization, Owner is authorized to divert and use not to exceed 262,500 acre-feet of currently authorized water for municipal, industrial, and mining use.

2. WATER CONSERVATION

Owner shall implement water conservation plans that provide for the utilization of those practices, techniques, and technologies that reduce or maintain the consumption of water, prevent or reduce the loss or waste of water, maintain or improve the efficiency in the use of water, increase the recycling and reuse of water, or prevent the pollution of water, so that a water supply is made available for future or alternative uses. Such plans shall include a requirement that in every water supply contract entered into, on or after the effective date of this amendment, including any contract extension or renewal, that each successive wholesale customer develop and implement conservation measures. If the customer intends to resell the water, then the contract for resale of the water shall have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures.

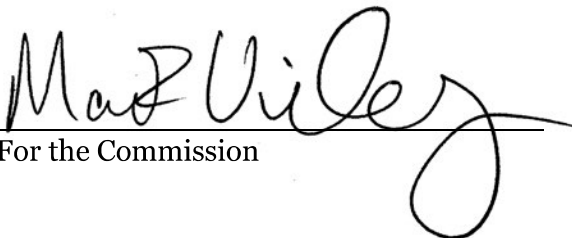
This amendment is issued subject to all terms, conditions and provisions contained in Certificate of Adjudication No. 14-5476, as amended, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Colorado River Basin.

Owner agrees to be bound by the terms, conditions, and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Commission on Environmental Quality and to the right of continuing supervision of State water resources exercised by the Commission.

  
For the Commission

Date Issued: **September 12, 2011**

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



AN ORDER cancelling portions of Certificate of Adjudication No. 14-5476A, owned by the Lower Colorado River Authority (LCRA).

A request for an abandonment of portions of Certificate of Adjudication No. 14-5476A in Matagorda County, owned by the LCRA, was presented to the Executive Director of the Texas Commission on Environmental Quality for approval pursuant to Texas Water Code §5.122.

Certificate of Adjudication No. 14-5476A authorizes the LCRA to maintain a dam and reservoir (Bay City Dam) on the Colorado River, Colorado River Basin and impound therein 1,560 acre-feet of water and to divert flows at a diversion point immediately adjacent to the dam at a maximum diversion rate of 3,000 cfs (1,375,560 gpm) for hydroelectric purposes in Matagorda County. The diversion of water for hydroelectric purposes is authorized on a non-priority basis.

On August 31, 2009, the LCRA filed an Abandonment of Water Right form requesting to abandon the following portions of Certificate of Adjudication No. 14-5476A: Paragraph 2, USE, authorizing diversion of up to 2,142,180 acre-feet of water per year for hydroelectric purposes; Paragraph 3, DIVERSION POINT, authorizing diversion of such water at a point (Diversion Point 4) immediately adjacent to the dam; Paragraph 5.a. SPECIAL CONDITION, referencing the "associated hydroelectric generation facility"; and Paragraph 6.b., PRIORITY, giving non-priority status to the diversion of water for hydroelectric purposes.

The requirements of Title 30 Texas Administrative Code §297.75 have been fulfilled and the Commission has jurisdiction to cancel the portions of Certificate of Adjudication No. 14-5476A contained in Paragraph 2, USE, authorizing diversion of up to 2,142,180 acre-feet of water per year for hydroelectric purposes; Paragraph 3, DIVERSION POINT, authorizing diversion of such water at a point (Diversion Point 4) immediately adjacent to the dam; Paragraph 5.a. SPECIAL CONDITION, referencing the "associated hydroelectric generation facility"; and Paragraph 6.b., PRIORITY, giving non-priority status to the diversion of water for hydroelectric purposes. Such portions have been willfully abandoned and should be cancelled to effectuate the policies of this state as set forth in Chapter 11 of the Texas Water Code, as amended. The LCRA has the capacity and authority to willfully abandon portions of the water right included in Certificate of Adjudication No. 14-5476A and to waive notice of and hearing in this matter.

NOW, THEREFORE, BE IT ORDERED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY that portions of the water right contained in Paragraph 2, USE, authorizing diversion of up to 2,142,180 acre-feet of water per year for hydroelectric purposes; Paragraph 3, DIVERSION POINT, authorizing diversion of such water at a point (Diversion Point 4) immediately adjacent to the dam; Paragraph 5.a. SPECIAL CONDITION, referencing the "associated hydroelectric generation facility"; and Paragraph 6.b., PRIORITY, giving non-priority status to the diversion of water for hydroelectric purposes included in Certificate of Adjudication No. 14-5476A, owned by the LCRA, is hereby forfeited, revoked, and cancelled.

If any provision, sentence, clause, or phrase of this Order is for any reason held to be invalid, the invalidity of any portion shall not affect the validity of the remaining portions of the Order.

  
For the Commission

DATE ISSUED: **FEB 19 2010**



# TEXAS WATER COMMISSION



## AMENDMENT TO CERTIFICATE OF ADJUDICATION

CERTIFICATE NO. 14-5476A

TYPE: AMENDMENT

Name:	Lower Colorado River Authority	Address:	PO BOX 220 AUSTIN TX 78767
Filed:	September 3, 1992	Granted:	NOV 18 1992
Purpose:	Hydroelectric Generation	Power County:	Matagorda
Watercourse:	Colorado River	Watershed:	Colorado River Basin

WHEREAS, Certificate of Adjudication No. 14-5476 was issued to the Lower Colorado River Authority (LCRA) on June 28, 1989, and authorizes owner to maintain two existing dams and reservoirs on the Colorado River; the Lane City Dam is authorized to impound 305 acre-feet of water and the Bay City Dam is authorized to impound 78 acre-feet of water. Owner is authorized to divert and use not to exceed 262,500 acre-feet of water per annum from the Colorado River to irrigate 50,000 acres of land within the Authority's Gulf Coast Water Division Service Area in Matagorda and Wharton Counties, Texas; and

WHEREAS, certificate owner seeks to change the description of the location of the Bay City Dam to reflect its actual location. The current description in the certificate is incorrect; and

WHEREAS, Lower Colorado River Authority seeks to amend that portion of the certificate which relates to the Bay City Dam and proposes to repair and modify the existing Bay City Dam; to increase the current pool elevation through replacing the existing flashboard system with a ten foot high reinforced concrete wall anchored to the dam's existing crest slab; to add a hydroelectric generating plant and construction of associated intake structure on the upstream side of the dam and an outfall structure located immediately downstream of the dam; and

WHEREAS, LCRA seeks to add a Diversion Point No. 4 to be associated with the intake structure and to add a maximum rate of diversion for the new diversion point of 3000 cfs; and

WHEREAS, the Texas Water Commission finds that jurisdiction over the application is established; and

WHEREAS, no person protested the granting of this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Water Commission in issuing this amendment.

NOW, THEREFORE, this amendment to Certificate No. 14-5476, is issued to the Lower Colorado River Authority, subject to the following:

1. IMPOUNDMENT

In Lieu of previous authorizations under Impoundment Paragraph 1. B - certificate owner is authorized to maintain an existing dam and reservoir on the Colorado River and impound therein not to exceed 1560 acre-feet at the normal maximum operating level. The Bay City Dam is located in the Bowman and Williams League, Abstract No. 9, and the Thomas Cayce Survey, Abstract No. 14, Matagorda County, approximately 3 miles southwest of Bay City, Texas.

2. USE

In addition to authorizations in Use Paragraph 2., owner is authorized:

To divert flows of the Colorado River through the Bay City Dam for hydroelectric power generation purposes. At the permittee's rate of diversion of 3000 cfs, approximately 2,142,180 acre-feet of water per annum will be diverted through the facility.

3. DIVERSION POINT

In addition to the diversion points authorized under the certificate in Diversion Paragraph A. (1, 2, & 3), owner is authorized:

Diversion Point No. 4 - At a point on the east, or left, bank of the reservoir (immediately adjacent to the dam) at a point located at Latitude 28.994° N, Longitude 96.020 W, also being N 6° W, 900 feet from the southern-most corner of the John F. Bowman and Henry Williams Grant, Abstract No. 9,

Matagorda County, Texas. The dam is at Latitude 28.994° N, Longitude 96.023 W.

The maximum diversion rate from Diversion Point No. 4 will be 3000 cfs (1,375,560 gpm).

4. TIME LIMITATIONS

- a. Modifications to the Bay City Dam shall be in accordance with plans approved by the Executive Director and shall be commenced within two years and completed within three years from date of issuance of this amendment.
- b. Failure to commence and/or complete the aforesaid modifications within the period stated above shall cause this amendment to expire and become null and void, unless certificate owner applies for an extension of time to commence and/or complete modifications prior to the respective deadlines for commencement and completion, and the application is subsequently granted.

5. SPECIAL CONDITION

- a. LCRA shall operate this dam and associated hydroelectric generation facility in accordance with their Water Management Plan, as amended.
- b. When ordered to do so by the Commission, certificate owner shall provide a means to pass inflows past the dam in such quantities as may be necessary to satisfy the rights of downstream domestic and livestock users and the senior and superior rights of other authorized users.

6. PRIORITY

- a. The time priority of the additional storage authorized under this amendment is September 3, 1992.
- b. Water diverted in the generation of hydroelectric power is used on a non-priority basis.

This amendment is issued subject to all terms, conditions and provisions contained in Certificate No. 14-5476, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Colorado River Basin.

Certificate owner agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Water Commission and to the right of continuing supervision of State water resources exercised by the Commission.

TEXAS WATER COMMISSION

  
John Hall, Chairman

DATE ISSUED: NOV 20 1992

ATTEST:

  
Gloria A. Vasquez, Chief Clerk



Certificate of Adjudication 14-5476

2. USE

LCRA is authorized to divert and use not to exceed 262,500 acre-feet of water per annum from the Colorado River to irrigate 50,000 acres of land located within the Authority's Gulf Coast Water Division Service Area in Matagorda and Wharton Counties, Texas.

3. DIVERSION

A. Location:

- (1) At a point on the east bank of the reservoir on the Colorado River authorized in Paragraph 1A, above, in the Sylvenus Castleman Grant, Abstract 11, Wharton County, Texas.
- (2) At a point on the east bank of the aforesaid reservoir on the Colorado River authorized in Paragraph 1B, above, in the John F. Bowman and Henry Williams Grant, Abstract 9, Matagorda County, Texas.
- (3) At a point on the west bank of the aforesaid reservoir on the Colorado River in the Thomas Cayce Grant, Abstract 14, Matagorda County, Texas.

B. Maximum rate:

- (1) 561.00 cfs (252,450 gpm) at Diversion Point 1.
- (2) 145.20 cfs (65,340 gpm) at Diversion Point 2.
- (3) 561.00 cfs (252,450 gpm) at Diversion Point 3.

4. PRIORITY

A. The time priority of LCRA's right is December 1, 1900 for the diversion and use of water for irrigation purposes, subject to the following conditions:

- (1) LCRA shall not impose its priority with respect to 33,930 acre-feet of water per year (the difference between 262,500 and 228,570 acre-feet per year) against any junior water right with a priority date senior to November 1, 1987.
- (2) The entire amount of water authorized herein is specifically subordinated, as to priority, to the City of Austin's Lake Austin Rights authorized and defined in Paragraph 5.A., Certificate of Adjudication 14-5471.

Certificate of Adjudication 14-5476

- B. The time priority of LCRA's right is November 8, 1939 for the impoundment of water in the reservoir authorized in Paragraph 1B, above.
  - C. The time priority of LCRA's right is October 24, 1983 for the impoundment of water in the reservoir authorized in Paragraph 1A, above.
5. SPECIAL CONDITIONS
- A. Owner shall maintain suitable outlets in the aforesaid dams authorized herein to allow the free passage of water that Owner is not entitled to divert or impound.
  - B. LCRA is authorized to impound water behind the dam authorized in Paragraph 1A, above, only between March 15 and October 15 of every year. During the remainder of the year, the Bascule Gate, or any other gate installed in this structure, will be in "down" or open position with no impoundment occurring.
  - C. LCRA is required to operate the closing of the gate of the dam authorized in Paragraph 1A, above, so as to minimize the effects on streamflow downstream. Specifically, LCRA shall not reduce streamflow past the gate to a flow lower than 75 percent of the streamflow indicated at the U.S.G.S. streamflow station at Wharton.

The location of pertinent features related to this certificate are shown on Page Nos. 17 and 18 of the Lower Colorado River Segment Certificates of Adjudication Maps, copies of which are located in the office of the Texas Water Commission, Austin, Texas.


This certificate of adjudication is issued subject to all terms, conditions and provisions in the final judgment and decree of the 264th Judicial District Court of Bell County, Texas, in Cause No. 115,414-A-1, In Re: The Exceptions of the Lower Colorado River Authority and the City of Austin to the adjudication of water rights in the Lower Colorado River Segment of the Colorado River Basin dated April 20, 1988 and supersedes all rights of the Owner asserted in that cause.

This certificate of adjudication is issued subject to senior and superior water rights in the Colorado River Basin.

Certificate of Adjudication 14-5476

This certificate of adjudication is issued subject to the Rules of the Texas Water Commission and its continuing right of supervision of State water resources consistent with the public policy of the State as set forth in the Texas Water Code.

TEXAS WATER COMMISSION

  
B. J. Wynne, III, Chairman

DATE ISSUED:

JUN 28 1989

ATTEST:

  
Brenda W. Foster, Chief Clerk



# WORKSHEET 3.0

## DIVERSION POINT (OR DIVERSION REACH) INFORMATION

This worksheet is **required** for each diversion point or diversion reach. Submit one Worksheet 3.0 for **each** diversion point and two Worksheets for **each** diversion reach (one for the upstream limit and one for the downstream limit of each diversion reach).

*The numbering of any points or reach limits should be consistent throughout the application and on supplemental documents (e.g. maps).*

### 1. Diversion Information (Instructions, Page. 24)

- a. This Worksheet is to add new (select 1 of 3 below):
1. \_\_\_ Diversion Point No.
  2. \_\_\_ Upstream Limit of Diversion Reach No.
  3. \_\_\_ Downstream Limit of Diversion Reach No.
- b. Maximum Rate of Diversion for **this new point** \_\_\_\_\_ cfs (cubic feet per second)  
or \_\_\_\_\_ gpm (gallons per minute)
- c. Does this point share a diversion rate with other points? Y / N \_\_\_\_\_  
*If yes, submit Maximum **Combined** Rate of Diversion for all points/reaches* \_\_\_\_\_ cfs or \_\_\_\_\_ gpm
- d. For amendments, is Applicant seeking to increase combined diversion rate? Y / N \_\_\_\_\_

*\*\* An increase in diversion rate is considered a new appropriation and would require completion of Section 1, New or Additional Appropriation of State Water.*

- e. Check (✓) the appropriate box to indicate diversion location and indicate whether the diversion location is existing or proposed:

Check one		Write: Existing or Proposed
	Directly from stream	
	From an on-channel reservoir	
	From a stream to an on-channel reservoir	
	Other method (explain fully, use additional sheets if necessary)	

- f. Based on the Application information provided, Staff will calculate the drainage area above the diversion point (or reach limit). If Applicant wishes to also calculate the drainage area, you may do so at their option.

Applicant has calculated the drainage area. Y / N \_\_\_\_\_

If yes, the drainage area is \_\_\_\_\_ sq. miles.

*(If assistance is needed, call the Surface Water Availability Team at (512) 239-4600, prior to submitting application)*

## 2. Diversion Location (Instructions, Page 25)

- a. On watercourse (USGS name): \_\_\_\_\_
- b. Zip Code: \_\_\_\_\_
- c. Location of point: In the \_\_\_\_\_ Original Survey No. \_\_\_\_\_, Abstract No. \_\_\_\_\_, \_\_\_\_\_ County, Texas.

***A copy of the deed(s) with the recording information from the county records must be submitted describing tract(s) that include the diversion structure.***

***For diversion reaches, the Commission cannot grant an Applicant access to property that the Applicant does not own or have consent or a legal right to access, the Applicant will be required to provide deeds, or consent, or other documents supporting a legal right to use the specific points when specific diversion points within the reach are utilized. Other documents may include, but are not limited to: a recorded easement, a land lease, a contract, or a citation to the Applicant's right to exercise eminent domain to acquire access.***

- d. Point is at:  
Latitude \_\_\_\_\_°N, Longitude \_\_\_\_\_°W.  
***Provide Latitude and Longitude coordinates in decimal degrees to at least six decimal places***
- e. Indicate the method used to calculate the location (examples: Handheld GPS Device, GIS, Mapping Program): \_\_\_\_\_
- f. Map submitted must clearly identify each diversion point and/or reach. See instructions Page. 38.
- g. If the Plan of Diversion is complicated and not readily discernable from looking at the map, attach additional sheets that fully explain the plan of diversion.

## WORKSHEET 4.0 DISCHARGE INFORMATION

This worksheet required for any requested authorization to discharge water into a State Watercourse for conveyance and later withdrawal or in-place use. Worksheet 4.1 is also required for each Discharge point location requested. **Instructions Page. 26. Applicant is responsible for obtaining any separate water quality authorizations which may be required and for insuring compliance with TWC, Chapter 26 or any other applicable law.**

- a. The purpose of use for the water being discharged will be \_\_\_\_\_.
- b. Provide the amount of water that will be lost to transportation, evaporation, seepage, channel or other associated carriage losses \_\_\_\_\_% and explain the method of calculation: \_\_\_\_\_

Is the source of the discharged water return flows? Y / N \_\_\_\_\_ If yes, provide the following information:

1. The TPDES Permit Number(s). \_\_\_\_\_ (attach a copy of the **current** TPDES permit(s))
2. Applicant is the owner/holder of each TPDES permit listed above? Y / N \_\_\_\_\_

*PLEASE NOTE: If Applicant is not the discharger of the return flows, the application should be submitted under Section 1, New or Additional Appropriation of State Water, as a request for a new appropriation of state water. If Applicant is the discharger, then the application should be submitted under Section 3, Bed and Banks.*

3. Monthly WWTP discharge data for the past 5 years in electronic format. (Attach and label as "Supplement to Worksheet 4.0").
  4. The percentage of return flows from groundwater \_\_\_\_\_, surface water \_\_\_\_\_?
  5. If any percentage is surface water, provide the base water right number(s) \_\_\_\_\_.
- c. Is the source of the water being discharged groundwater? Y / N \_\_\_\_\_ If yes, provide the following information:
1. Source aquifer(s) from which water will be pumped: \_\_\_\_\_
  2. Any 24 hour pump test for the well if one has been conducted. If the well has not been constructed, provide production information for wells in the same aquifer in the area of the application. See <http://www.twdb.texas.gov/groundwater/data/gwdbbrpt.asp>. Additionally, provide well numbers or identifiers \_\_\_\_\_.
  3. Indicate how the groundwater will be conveyed to the stream or reservoir.
  4. A copy of the groundwater well permit if it is located in a Groundwater Conservation District (GCD) or evidence that a groundwater well permit is not required.
- ci. Is the source of the water being discharged a surface water supply contract? Y / N \_\_\_\_\_ If yes, provide the signed contract(s).
- cii. Identify any other source of the water \_\_\_\_\_

## WORKSHEET 4.1 DISCHARGE POINT INFORMATION

This worksheet is required for **each** discharge point. Submit one Worksheet 4.1 for each discharge point. If there is more than one discharge point, the numbering of the points should be consistent throughout the application and on any supplemental documents (e.g. maps).  
**Instructions, Page 27.**

**For water discharged at this location provide:**

- a. The amount of water that will be discharged at this point is \_\_\_\_\_ acre-feet per year. The discharged amount should include the amount needed for use and to compensate for any losses.
- b. Water will be discharged at this point at a maximum rate of \_\_\_\_\_ cfs or \_\_\_\_\_ gpm.
- c. Name of Watercourse as shown on Official USGS maps: \_\_\_\_\_
- d. Zip Code \_\_\_\_\_
- f. Location of point: In the \_\_\_\_\_ Original Survey No. \_\_\_\_\_, Abstract No. \_\_\_\_\_, \_\_\_\_\_ County, Texas.
- g. Point is at:  
Latitude \_\_\_\_\_°N, Longitude \_\_\_\_\_°W.  
***\*Provide Latitude and Longitude coordinates in decimal degrees to at least six decimal places***
- h. Indicate the method used to calculate the discharge point location (examples: Handheld GPS Device, GIS, Mapping Program): \_\_\_\_\_

**Map submitted must clearly identify each discharge point. See instructions Page. 15.**

# WORKSHEET 5.0

## ENVIRONMENTAL INFORMATION

### 1. Impingement and Entrainment

This section is required for any new diversion point that is not already authorized. Indicate the measures the applicant will take to avoid impingement and entrainment of aquatic organisms (ex. Screens on any new diversion structure that is not already authorized in a water right). **Instructions, Page 29.**

Request does not seek new diversion point; however, see Addendum to Worksheet 5.

### 2. New Appropriations of Water (Canadian, Red, Sulphur, and Cypress Creek Basins only) and Changes in Diversion Point(s)

This section is required for new appropriations of water in the Canadian, Red, Sulphur, and Cypress Creek Basins and in all basins for requests to change a diversion point. **Instructions, Page 30.**

Description of the Water Body at each Diversion Point or Dam Location. (Provide an Environmental Information Sheet for each location),

a. Identify the appropriate description of the water body.

Stream

Reservoir

Average depth of the entire water body, in feet: \_\_\_\_\_

Other, specify: \_\_\_\_\_

b. Flow characteristics

If a stream, was checked above, provide the following. For new diversion locations, check one of the following that best characterize the area downstream of the diversion (check one).

Intermittent - dry for at least one week during most years

Intermittent with Perennial Pools - enduring pools

Perennial - normally flowing

Check the method used to characterize the area downstream of the new diversion location.

USGS flow records

Historical observation by adjacent landowners

Personal observation

Other, specify: \_\_\_\_\_

c. Waterbody aesthetics

Check one of the following that best describes the aesthetics of the stream segments affected by the application and the area surrounding those stream segments.

- Wilderness: outstanding natural beauty; usually wooded or ungrazed area; water clarity exceptional
- Natural Area: trees and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity discolored
- Common Setting: not offensive; developed but uncluttered; water may be colored or turbid
- Offensive: stream does not enhance aesthetics; cluttered; highly developed; dumping areas; water discolored

d. Waterbody Recreational Uses

Are there any known recreational uses of the stream segments affected by the application?

- Primary contact recreation (swimming or direct contact with water)
- Secondary contact recreation (fishing, canoeing, or limited contact with water)
- Non-contact recreation

Submit the following information in a Supplemental Attachment, labeled Addendum to Worksheet 5.0:

1. Photographs of the stream at the diversion point or dam location. Photographs should be in color and show the proposed point or reservoir and upstream and downstream views of the stream, including riparian vegetation along the banks. Include a description of each photograph and reference the photograph to the map submitted with the application indicating the location of the photograph and the direction of the shot.
2. If the application includes a proposed reservoir, also include:
  - i. A brief description of the area that will be inundated by the reservoir.
  - ii. If a United States Army Corps of Engineers (USACE) 404 permit is required, provide the project number and USACE project manager.
  - iii. A description of how any impacts to wetland habitat, if any, will be mitigated if the reservoir is greater than 5,000 acre-feet.

LCRA has completed the relevant portions of this Worksheet consistent with the requirements of WRPERM 5731 and has included with the Addendum the environmental information required by WRPERM 5731 Special Conditions 6.C.(v)(c) & (d) and 6.E. (ii).

### 3. Alternate Sources of Water and/or Bed and Banks Applications

This section is required for applications using an alternate source of water and bed and banks applications in any basins. **Instructions, page 31.**

- a. For all bed and banks applications:
  - i. Submit an assessment of the adequacy of the quantity and quality of flows remaining after the proposed diversion to meet instream uses and bay and estuary freshwater inflow requirements.

b. For all alternate source applications:

- i. If the alternate source is treated return flows, provide the TPDES permit number\_\_\_\_\_

- ii. If groundwater is the alternate source, or groundwater or other surface water will be discharged into a watercourse provide:

Reasonably current water chemistry information including but not limited to the following parameters in the table below. Additional parameters may be requested if there is a specific water quality concern associated with the aquifer from which water is withdrawn. If data for onsite wells are unavailable; historical data collected from similar sized wells drawing water from the same aquifer may be provided. However, onsite data may still be required when it becomes available. Provide the well number or well identifier. Complete the information below for each well and provide the Well Number or identifier.

Parameter	Average Conc.	Max Conc.	No. of Samples	Sample Type	Sample Date/Time
Sulfate, mg/L					
Chloride, mg/L					
Total Dissolved Solids, mg/L					
pH, standard units					
Temperature*, degrees Celsius					

\* Temperature must be measured onsite at the time the groundwater sample is collected.

- iii. If groundwater will be used, provide the depth of the well\_\_\_\_\_and the name of the aquifer from which water is withdrawn\_\_\_\_\_.

**Addendum to Worksheet 5 (Environmental Information)**  
**LCRA'S APPLICATION TO AMEND WR PERMIT NO. 5731**

1. **Photographs included as Attachment 1 to this Addendum** (identified as labeled on aerial map):
  - a. Photo of Arbuckle Reservoir
  - b. Diversion facilities upstream

2. **Measures to avoid impingement and entrainment of aquatic resources (See Permit 5731, Special Condition 6.E(ii)):**

LCRA will be using existing diversion facilities presently associated with LCRA's Certificate of Adjudication No. 14-5476, Paragraph 3.A(1). LCRA is not making any alterations to these facilities as part of this amendment. Therefore, the proposed amendment to designate Arbuckle Reservoir under Permit No. 5731 will have no impact on entrainment or impingement. As such, LCRA is not proposing additional measures to avoid impingement and entrainment.

3. **Information related to Arbuckle Reservoir:**

- a. Description of inundated area – The reservoir is an existing earthen ring-dike, off-channel reservoir. The reservoir was constructed in an area that was predominantly comprised of nearly flat pastures and agricultural fields used for production of various row crops and turf grass. The Project Area Boundary is depicted in **Attachments 2 & 3** to this Addendum, which was included the LCRA's Preconstruction Notice submitted to the U.S. Corps of Engineers associated with Permit No. SWG-2013-00229.
- b. Permit No. SWG-2013-00229 (Nationwide Permit Verification); Jayson Hudson (Project Manager)
- c. Description of mitigation of impacts to wetland habitat (see also Permit No. 5731 Special Condition 6.E(ii))

Riparian areas along the Colorado River were excluded from the Project Area except those locations where the existing infrastructure along the river was repaired or replaced and a new river outfall was constructed. LCRA also excluded an approximately 200-foot wide buffer zone along both banks of Jarvis Creek except in those areas where existing infrastructure was allowed to be removed and replaced.

LCRA delineated potentially affected Waters of the United States (WOTUS), and proposed minimization and avoidance measures to such WOTUS when it secured its authorization from the U.S. Army Corps of Engineers. This included permanent avoidance of the only jurisdictional wetland (0.2 acres) within the project area and significant minimization measures designed to reduce potential impacts to riparian habitat associated with Jarvis Creek and an unnamed tributary to Jarvis Creek. In confirming that the project qualified for authorization under its nationwide permitting program, the Corps concluded that the proposed project would have no more than minimal adverse environmental effect. These activities are more particularly described in the 2015 PCN, which was reauthorized in March 2018 (See **Attachments 2 & 3** to this Addendum)).



4. The proposed amendment will have no impact on water quality or instream flows of any tributaries to the Colorado River. Arbuckle Reservoir is already authorized and has been constructed consistent with LCRA's authorization from the Corps of Engineers, which requires specific minimization and avoidance measures to protect against water quality impacts. Further, instream flows of Jarvis Creek are unimpeded.

**5. Salinity Analysis Results**

Special Condition 6.C(v)(e) limits the conditions under which the Commission may adjust the Seasonal Inflow Criteria in Table 2, Special Condition 6.C.(ii)(a), based on the results of the Salinity Analysis or other circumstances related to installed diversion capacity and actual diversions, none of which are triggered by this permit amendment application.

Specifically, the Commission may only adjust the seasonal inflow criteria if the Percentage Exceedance for any season is greater than 30%. The Percentage Exceedance is described in Special Condition 6.C(v)(a)(2) as “the percentage of days that the salinity at Shellfish Marker B Transect...exceeded the [Salinity Targets] out of the days in which Seasonal Inflow Criteria...were satisfied.” The Salinity Targets and Seasonal Inflow Criteria, as defined in the permit are shown below in Table 1. Exceedance values for a 15-year period (2004-2019) were calculated, and the results are shown in Table 2. As shown in Table 2, exceedance values for all seasons were well below the 30% threshold that would trigger an adjustment of inflow criteria according to the permit.

<b>Table 1. Cumulative Inflow and Salinity Targets</b>			
Month	Season <sup>(1)</sup>	Minimum 60-day Cumulative Seasonal Inflow Criteria (acre-feet) <sup>(2)</sup>	Maximum Salinity Targets (parts per thousand) <sup>(1)</sup>
January	November-February	190,000	23.00
February	November-February	190,000	23.00
March	March-June	365,000	18.50
April	March-June	400,000	18.50
May	March-June	400,000	18.50
June	March-June	365,000	18.50
July	July-October	260,000	21.50
August	July-October	260,000	21.50
September	July-October	260,000	21.50
October	July-October	260,000	21.50
November	November-February	190,000	23.00
December	November-February	190,000	23.00

Notes:

(1) Permit section: 6.C(v)(a)(2) Table 4

(2) Permit section: 6.C(ii)(a) Table 2

**Table 2. Seasonal Exceedance Values**

<b>Season</b>	<b>No. of Days meeting Flow Target</b>	<b>No. of days meeting Flow target and salinity criteria<sup>(1)</sup></b>	<b>Exceedance %</b>	<b>Less Than 30%?</b>
July-October	393	393	0.0%	Y
March-June	393	352	10.4%	Y
November-February	705	686	3%	Y

Notes:

- (1) Salinity was calculated as the average salinity between the values at Shellfish Marker B and West Bay Tripod monitoring stations. When data was only available at one site, the value for that site was used. When data was not available for either site, it was excluded from the analysis. Ten days where inflow targets were met were excluded from the analysis due to lack of salinity data.

**Attachment 4** to this Addendum contains the detailed Salinity Analysis spreadsheet from which the above summary is derived.

**Attachment 5** is a compilation of the comments LCRA received from the parties to the contested case hearing on LCRA's Application regarding the Salinity Analysis and Accounting Plan, as required by Special Conditions 6.C.(v)(c)&(d) and 6.F, as well as LCRA's response to such comments. LCRA made a draft version of the application materials available for review and comment by these parties and also conducted a virtual meeting with October 13, 2020.

## **Worksheet 5**

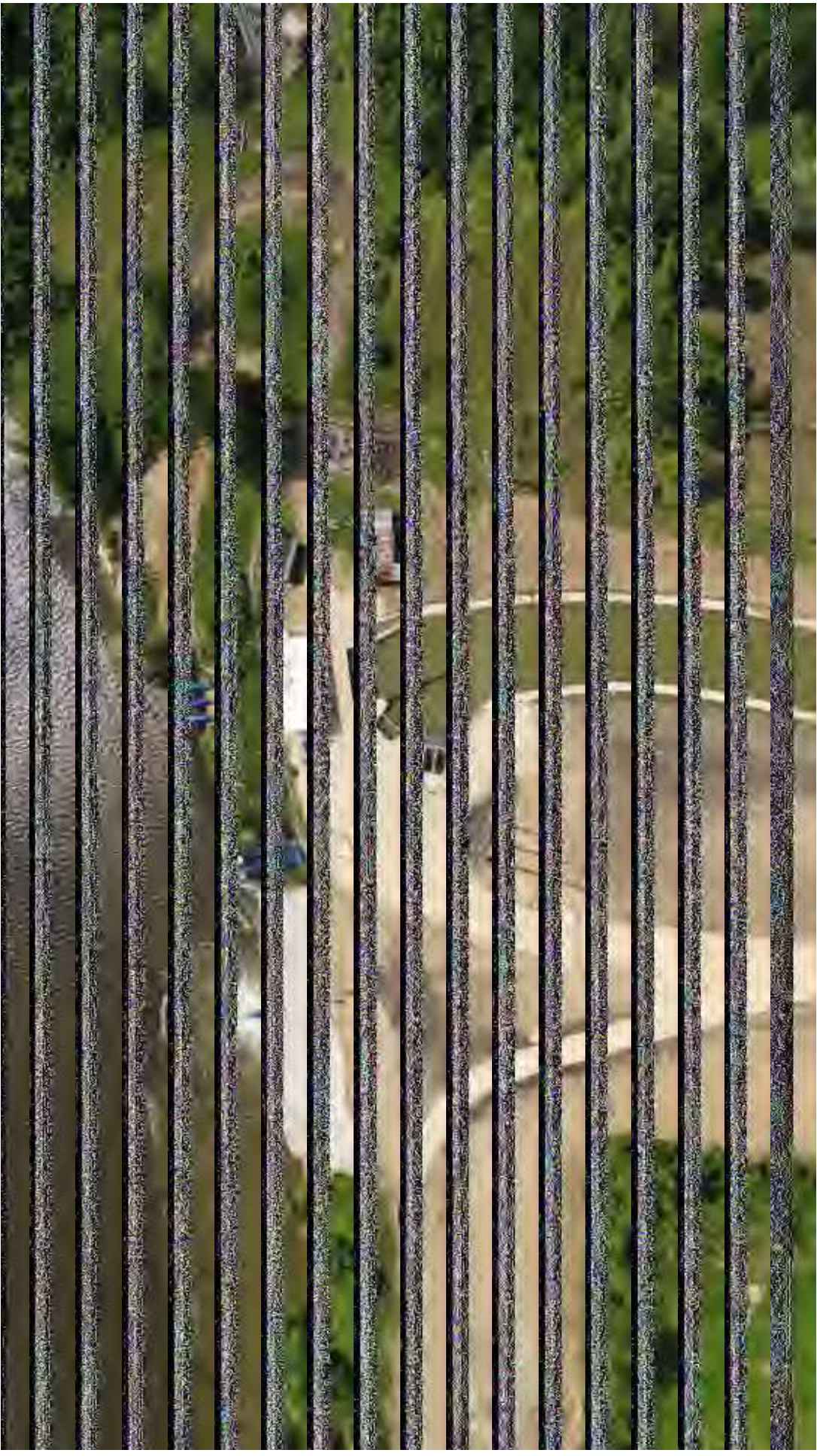
### **Attachment 1:**

#### **Photos**



Worksheet 5 - Attachment 1: Arbuckle Reservoir





Worksheet 5 - Attachment 1: River Pump Station (2019)

## **Worksheet 5**

### **Attachment 2:**

**USACE Galveston - LCRA PCN (2015)**

## **Worksheet 5**

### **Attachment 3:**

**USACE Galveston - LCRA Permit Verification (2018)**

## **Worksheet 5**

### **Attachment 4:**

## **Salinity Analysis Spreadsheet**



## **Worksheet 5**

### **Attachment 5:**

**Documentation of Consultation with Protesting Parties  
on Salinity Analysis and Accounting Plan**

**ATTACHMENT 5 to WORKSHEET 5 ADDENDUM**

Commenter	Comment	Response
NWF and Sierra Club	NWF and Sierra Club do not have any comments on the initial Salinity Analysis, but disagree somewhat with the characterization of the results of that analysis included in the Summary of Request in the draft amendment application. We agree that the analysis does not indicate the need for a change in the special conditions related to freshwater inflows under the test stated in the permit. However, it seems to be an overstatement of the extent and purpose of the analysis to characterize it as an affirmative demonstration that modifications are unnecessary.	LCRA modified the application to use language more consistent with the language in Permit 5731. The revised language states that "...the Salinity Analysis demonstrates that no modifications to the special conditions related to freshwater inflows shall be made at this time.
NWF and Sierra Club	As we understand the requirements of Permit 5731, once diversions commence under the Permit, LCRA must maintain two salinity monitoring instruments at the West Bay @ Tripod location and two such instruments at the West Bay @ Shellfish Marker B location (Permit Condition 6.F.(d)(1)). It appears that the Accounting Plan reflects only a single instrument at each location. We believe the Accounting Plan should be set up to reflect two instruments at each location, with an averaging function included so that the measurements from the two instruments at each location are averaged to provide the salinity value for that location when both are available and to use the available value when there is only one available. (Permit Condition 6.F.(d)(3)). That approach would seem to allow the calculations to continue until additional instrumentation is installed prior to commencement of diversions, while also reflecting permit conditions applicable after that point.	LCRA appreciates the suggestion and has modified the accounting plan to build in functionality for the second sonde at each location.
NWF and Sierra Club	We understand the Permit to require LCRA to respond within three business days to address situations where deviations in measurements for the two instruments at a location are greater than 3 ppt. That level of deviation also triggers a change in the approach used for the overall salinity calculation (Permit Condition 6.F.(d)(3)(C)).The interpolation approach currently included in the Accounting Plan appears to be inconsistent with that requirement. As noted above, we recognize that the requirement under the Permit for duplicate instruments at each location (Permit Condition 6.F.(d)(2)) is triggered once diversions commence. However, we believe the Accounting Plan should be set up to track such deviations and flag the need for instrument repair or replacement, so that those provisions are properly implemented once the instrumentation is required to be in place.	LCRA will implement an internal database-directed mechanism to identify and notify the appropriate LCRA staff when there are deviations in measurements greater than 3 ppt.  Further, as discussed above, the accounting plan has been modified to build in the functionality for the second sonde at each location.
TCEQ	General: We noted a number of typographical errors throughout both the salinity analysis spreadsheet and the accounting plan spreadsheet and recommend that all documents be reviewed for consistency.	LCRA has reviewed the documents to correct typographical errors and better ensure consistency.
TCEQ	LCRA did not provide an unlocked spreadsheet for purposes of this preliminary review, which made it difficult to perform a thorough review of the calculations. LCRA will need to provide an unlocked spreadsheet when the application is submitted.	An unlocked version was added to the Sharepoint site shared with the parties, and is also included in our application.
TCEQ	We acknowledge that the text document in Worksheet 7 Attachment 1 includes a brief description of each worksheet and information about the data used in the worksheet. The text document submitted with the application should also include more detailed descriptions of the specific calculations in each worksheet as described in Worksheet 7 Item 2.a.2. of the Technical Information Report.	LCRA has added more detailed descriptions of the specific calculations in each worksheet in the file named 'Permit5731_Narrative_for_AccountingPlan-Attachment'
TCEQ	Worksheet "Test 6.B. Channel Maintenance":  The Match function in Column B should be adjusted so that it increments through the entire range of the referenced table. The lookup range is currently locked at \$R\$11:\$R\$14 and the referenced table range is R11-R18.  The formula in column D should be revised to add 2 days rather than subtracting 2 days.  Column F may need to be revised to reference Column W of the ChannelMaintenanceData worksheet. Column W of the ChannelMaintenanceData worksheet accounts for the 95% attenuation between the Columbus and Wharton gages but this calculation is not used or referenced elsewhere in the worksheets.	LCRA has made the suggested revisions. A column was inserted between E and F, with the value from Column W of the ChannelMaintenanceData worksheet referenced in the new column F. Now "Is Channel Maintenance requirement met?" is in column G and it also considers the result in new column F.
TCEQ	Worksheet "ChannelMaintenanceData"  The calculations in columns E, F, H, J, and K related to the timing relationship between qualifying events at Columbus and Wharton use a different number of days in several of the lookback tests. For example, Column E looks back seven days while Column F looks back twelve days. The MAX function in Column H looks back 3 days (including the current day) to determine whether a day is part of a qualifying event at the Wharton gage and the same calculation in Column C for the Columbus gage uses the current day value. Absent a detailed description of the calculations, as described in Accounting Plan Item 1 in this comment letter, we are unable to fully determine whether the calculations in this worksheet are consistent with the accounting plan requirements in Permit 5731.  The formula in Column C may need revision to ensure that qualifying days are correctly identified. In addition, it appears that the formula in Column C does not test for flows below 27,000 cfs within the first 48 hours after initiation of a qualifying event.  The formula in Column H may need revision. There appears to be a redundant MAX function within the OR function. Column H also uses a 90% qualifying event criterion instead of the 95% criterion used in Column W and described in the assumption statements in the worksheet. There is also a typographic error in the column header.  The formula in Column J has a #REF! error appearing in the MAX function in cells J11-J74.	Column C. is sequence number assigned to all dates with Columbus Q >= 27,000 cfs and each event is at least 48 hours from first hours with >= 27,000 cfs (round up to 3 days for daily timestep).  Column D. is sequence number assigned to last date of each event.  Column E. is highest flow during the current event, set based on a non zero in D. and now searches current and all previous dates with the current sequence number in C. This uses formula =IF(D138>0,MAX( (C\$11:C138=D138)*B\$11:B138),0)  Column F. is date of highest flow in column E , set based on a non zero in E. and now searches current and all previous dates with the current sequence number in C. This uses formula IF(E138=0,"- ",ROUND(SUMIFS(\$A\$11:\$A138,\$B\$11:\$B138,\$E138,\$C\$11:\$C138,\$D138)/COUNTIFS(\$B\$11:\$B138,\$E138,\$C\$11:\$C138,\$D138)-0.01,1))  Column H. is redefine to show the sequence number from column 2 days prior.  Columns I., J., and K. now are the same equations as in C., D., and E. (relative addresses except for Date in A.).  Column J. no longer has a REF# error.

**ATTACHMENT 5 to WORKSHEET 5 ADDENDUM**

<b>Commenter</b>	<b>Comment</b>	<b>Response</b>
TCEQ	Worksheet "Test 6.C.(iv) High-Flow Scalp":  The formula in Column G should use 3,800 instead of 2,200.  There is a typographic error in the header for Column L.	LCRA has made the suggested revisions.
TCEQ	Worksheet "CR_InflowToBay"  The calculation in Column J is not consistent with the text description in this worksheet. The formula in Column J should reference the Bay City date in Column H rather than the Wharton date in Column A for STP diversions. According to the description, STP diversions "for that date" refer to the Bay City date for both Methods A & B. The calculations in Columns K & L subtract STP diversions from the previous day.  The headings for Columns E, F & G are not consistent with the text description for this worksheet and the calculations in these columns.	LCRA has made the suggested revisions. Diversions in columns E, F, G, and J should be on Bay City Date, so the formulas were corrected to refer to date in column H instead of A.
TCEQ	Worksheet "CumulativeSalinityDeparture":  The text document for this accounting plan should provide additional detail related to interpolated salinity values and how use of those values for multiple days demonstrates compliance with Paragraph 6.F.d.2 in Permit 5731 related to Instrument Reliability.  The headings for Columns S & T indicate compliance with the requirement for CSD reset from a value greater than 2,200; however, the calculations in these columns do not test for a CSD value above 2,200 prior to the reset. The calculation in Column J in the Test 6.C.(ii) Seasonal Inflow worksheet is directly dependent on these calculations.  The formulas in Columns Q & T should be revised to exclude cells J1-J10 and S1-S10 because these cells do not contain data.	The interpolation is necessary for historical data. Paragraph 6.F.d.1 in Permit 5731 states "Beginning at such time that Permittee initiates diversions under this permit ..., " so the Instrument Reliability does not seem to apply to historical salinity data. Column S now includes a check for CSD prior to reset being > 2,200. Columns Q & T have been revised to note the "does not apply for first 90 days" and "... 60 days".
TCEQ	Worksheet "Ref_3-HighFlowScalpingCriteria"  The values in Table_High Flow Criteria (rows 28 – 31) are transposed.	LCRA has made the suggested revisions.
TPWD	Did LCRA conduct an environmental assessment of the Arbuckle site other than the report submitted to the USACE for the Nationwide permit?	LCRA was not required nor requested to complete an environmental assessment as part of its permitting with TCEQ or the USACE.
TPWD	Did LCRA prepare a riparian management plan as per permit Special Condition 6.D.?	LCRA has not developed a riparian management plan at this time. That plan is required prior to diversions. It is not required for the amendment we are seeking.
TPWD	Has LCRA identified an amount of water that will be diverted into Arbuckle under WR #5731?	Not at this time.
Matagorda Bay Foundation	No comments were received.	
STP	No comments were received.	
City of Austin	No comments were received.	
CCA	No comments were received.	

# WORKSHEET 6.0

## Water Conservation/Drought Contingency Plans

This form is intended to assist applicants in determining whether a Water Conservation Plan and/or Drought Contingency Plans is required and to specify the requirements for plans.

**Instructions, Page 31.**

*The TCEQ has developed guidance and model plans to help applicants prepare plans. Applicants may use the model plan with pertinent information filled in. For assistance submitting a plan call the Resource Protection Team (Water Conservation staff) at 512-239-4600, or e-mail [wras@tceq.texas.gov](mailto:wras@tceq.texas.gov). The model plans can also be downloaded from the TCEQ webpage. **Please use the most up-to-date plan documents available on the webpage.***

### 1. Water Conservation Plans

a. The following applications must include a completed Water Conservation Plan (30 TAC § 295.9) for each use specified in 30 TAC, Chapter 288 (municipal, industrial or mining, agriculture – including irrigation, wholesale):

1. Request for a new appropriation or use of State Water.
2. Request to amend water right to increase appropriation of State Water.
3. Request to amend water right to extend a term.
4. Request to amend water right to change a place of use.  
*\*does not apply to a request to expand irrigation acreage to adjacent tracts.*
5. Request to amend water right to change the purpose of use.  
*\*applicant need only address new uses.*
6. Request for bed and banks under TWC § 11.042(c), when the source water is State Water  
*\*including return flows, contract water, or other State Water.*

b. If Applicant is requesting any authorization in section (1)(a) above, indicate each use for which Applicant is submitting a Water Conservation Plan as an attachment:

1. \_\_\_\_Municipal Use. See 30 TAC § 288.2. \*\*
2. \_\_\_\_Industrial or Mining Use. See 30 TAC § 288.3.
3. \_\_\_\_Agricultural Use, including irrigation. See 30 TAC § 288.4.
4. \_\_\_\_Wholesale Water Suppliers. See 30 TAC § 288.5. \*\*

**\*\*If Applicant is a water supplier, Applicant must also submit documentation of adoption of the plan. Documentation may include an ordinance, resolution, or tariff, etc. See 30 TAC §§ 288.2(a)(1)(J)(i) and 288.5(1)(H). Applicant has submitted such documentation with each water conservation plan? Y / N\_\_\_\_**

c. Water conservation plans submitted with an application must also include data and information which: supports applicant's proposed use with consideration of the plan's water conservation goals; evaluates conservation as an alternative to the proposed

appropriation; and evaluates any other feasible alternative to new water development.  
See 30 TAC § 288.7.

Applicant has included this information in each applicable plan? Y / N\_\_\_\_

## 2. Drought Contingency Plans

- a. A drought contingency plan is also required for the following entities if Applicant is requesting any of the authorizations in section (1) (a) above – indicate each that applies:
1. \_\_\_\_Municipal Uses by public water suppliers. See 30 TAC § 288.20.
  2. \_\_\_\_Irrigation Use/ Irrigation water suppliers. See 30 TAC § 288.21.
  3. \_\_\_\_Wholesale Water Suppliers. See 30 TAC § 288.22.
- b. If Applicant must submit a plan under section 2(a) above, Applicant has also submitted documentation of adoption of drought contingency plan (*ordinance, resolution, or tariff, etc.* See 30 TAC § 288.30) Y / N\_\_\_\_

# WORKSHEET 7.0

## ACCOUNTING PLAN INFORMATION WORKSHEET

The following information provides guidance on when an Accounting Plan may be required for certain applications and if so, what information should be provided. An accounting plan can either be very simple such as keeping records of gage flows, discharges, and diversions; or, more complex depending on the requests in the application. Contact the Surface Water Availability Team at 512-239-4600 for information about accounting plan requirements, if any, for your application. **Instructions, Page 34.**

### 1. Is Accounting Plan Required

Accounting Plans are generally required:

- For applications that request authorization to divert large amounts of water from a single point where multiple diversion rates, priority dates, and water rights can also divert from that point;
- For applications for new major water supply reservoirs;
- For applications that amend a water right where an accounting plan is already required, if the amendment would require changes to the accounting plan;
- For applications with complex environmental flow requirements;
- For applications with an alternate source of water where the water is conveyed and diverted; and
- For reuse applications.

Accounting plan documents are included as required by Permit No. 5731. Documentation of consultation with prior protestants required by Special Condition 6.F is included with Attachment 5 to the Worksheet 5 Addendum.

### 2. Accounting Plan Requirements

- a. A **text file** that includes:
1. an introduction explaining the water rights and what they authorize;
  2. an explanation of the fields in the accounting plan spreadsheet including how they are calculated and the source of the data;
  3. for accounting plans that include multiple priority dates and authorizations, a section that discusses how water is accounted for by priority date and which water is subject to a priority call by whom; and
  4. Should provide a summary of all sources of water.
- b. A **spreadsheet** that includes:
1. Basic daily data such as diversions, deliveries, compliance with any instream flow requirements, return flows discharged and diverted and reservoir content;
  2. Method for accounting for inflows if needed;
  3. Reporting of all water use from all authorizations, both existing and proposed;
  4. An accounting for all sources of water;
  5. An accounting of water by priority date;
  6. For bed and banks applications, the accounting plan must track the discharged water from the point of delivery to the final point of diversion;
  7. Accounting for conveyance losses;
  8. Evaporation losses if the water will be stored in or transported through a reservoir. Include changes in evaporation losses and a method for measuring reservoir content resulting from the discharge of additional water into the reservoir;
  9. An accounting for spills of other water added to the reservoir; and
  10. Calculation of the amount of drawdown resulting from diversion by junior rights or diversions of other water discharged into and then stored in the reservoir.

## **Worksheet 7**

### **Attachment 1:**

**Permit5731\_Narrative\_for\_AccountingPlan**

**Permit5731\_Narrative\_for\_AccountingPlan-Attachment**

**Permit 5731 Application, Narrative for Accounting Plan  
[Worksheet 7, Attachment 1]**

This Amendment application seeks to amend Permit No. 5731 to authorize LCRA's Arbuckle Reservoir as a specific off-channel reservoir in which LCRA may store water diverted under this Permit. LCRA's Arbuckle Reservoir is already authorized by Certificate of Adjudication No. 14-5476, as amended. Construction of the reservoir and related facilities is nearing completion.

Diversions of water under the Permit for storage in Arbuckle Reservoir under the requested amendment would occur at the location authorized under Paragraph 3.A(iii) of the Permit, and rely on the existing diversion facilities used by LCRA under Certificate of Adjudication 14-5476, as amended, Paragraph 3.A(1), at a maximum rate of diversion of 560 cfs.

An Accounting Plan, developed by LCRA, is submitted with this application.

This Accounting Plan is an Excel workbook file (xlsx extension) with 20 worksheets; with a brief description including what data is included for each worksheet. A more detailed explanation of the worksheets is provided in the Attachment to this Narrative.

**FINAL\_Daily** – Required information for those dates on which daily diversions to and/or from Arbuckle Reservoir occurred under Permit 5731. Results of analyses for compliance with SPECIAL CONDITIONS 6.A., 6.B., and 6.C.(ii) or (iii) or (iv) are shown here.

- Column D refers to right-most column on worksheet **Test 6.A. Instream Flow**
- Column E refers to right-most column on worksheet **Test 6.B. Channel Maintenance**
- Column F refers to right-most column on worksheet **Test 6.C.(ii) Seasonal Inflow**
- Column G refers to right-most column on worksheet **Test 6.C.(iii) Low-Salinity**
- Column H refers to right-most column on worksheet **Test 6.C.(iv) High-Flow Scalp**

**FINAL\_Annual** – sums the daily diversions to and/or from Arbuckle Reservoir that occurred under Permit 5731 for calendar year(s).

**Arbuckle Res Diversions in&out** – information for all dates on which daily diversions to and/or from Arbuckle Reservoir occurred, not just those under Permit 5731. This information is an intermediate result.

- Column F has Diversion from Colorado River into Arbuckle Reservoir authorized under Permit 5731
- Column H has Diversion from Arbuckle Reservoir authorized under Permit 5731

**Test 6.A Instream Flow** – for just dates listed on the FINAL\_Daily worksheet, compare calculated flow passing the Lane City diversion point (also called Gulf Coast 2 Diversion) against the Instream Flow criteria from **Ref\_1-IF\_Criteria@Wharton** worksheet. Determine if the Instream Flow criteria are satisfied with Yes or No in the right-most column.

**Ref-1-IF\_Criteria@Wharton** – data copied from Permit 6.A.(i) Table 1: Monthly Instantaneous Instream Flow Criteria at USGS gage 08162000, Colorado River at Wharton Texas



**Test 6.B Channel Maintenance** – for just dates listed on the **FINAL\_Daily** worksheet, determine if a Qualifying Channel Maintenance Flow has passed the diversion point within past 24 months. The values here come from the intermediate calculations on **ChannelMaintenanceData** worksheet. Determine if the Channel Maintenance criteria are satisfied with Yes or No in the right-most column.

**ChannelMaintenanceData** – complicated analysis to identify Qualifying Channel Maintenance Flows at Columbus gage looking at all dates. Such events must be evaluated for the 24-month period prior to any diversions from the Colorado River under Permit 5731. This information is an intermediate result.

- Column B is the daily maximum streamflow from **Columbus USGS max, min, mean** worksheet.
- Column C assigns a sequence number to each day in a qualifying event, with either a peak Q at least 27,000 cfs or less than 2 days after the first day of the event.
- Column D is first date of an event.
- Column E is the sequence number on the last day of an event.
- Column F is last date of event.
- Column G is the highest streamflow during the event.
- Column H is the date of the highest streamflow during the event.
- Column I is the daily maximum streamflow from **Wharton USGS max, min, mean** worksheet.
- Columns J-M are similar to C,E,G,H.
- Column N is Diversion from Colorado River into Arbuckle Reservoir authorized under Permit 5731 (CFS) .
- Columns O,P,Q are for identifying a different type of High-Flow event at Wharton (>8,000 cfs for 2 consecutive days at Wharton) to be used for **Test 6.C.(iv) High-Flow Scalp** worksheet.
- Column R is blank.
- Column S is Sequence number for qualifying Channel Maintenance Flow Event
- Columns T to X assemble values from columns D, F, D+days, F+2 days, sum of N. Column headers in row 10 explain what the data are.
- Column YR is blank
- Column X answers “Did the qualifying channel maintenance flow event be allowed to pass the Lane City diversion point without any diversions under this permit?” This value is used in the column F & G of **Test 6.B Channel Maintenance**. For simplicity, the test in Column X was set up to check against any LCRA diversions during the 48-hour period after 27,000 cfs occurs. This simplification is more restrictive than the permit. LCRA reserves the right to divert during this period consistent with the permit, so long as the flow at the diversion location does not fall below the equivalent of 27,000 cfs.

**Test 6.C.(ii) Seasonal Inflow** – this is the first of three steps related to 6.C. Beneficial Inflow Criteria. Special Condition 6.C.(ii) is the focus here. Columns A to N assemble values from **Final\_Daily**, **CumulativeSalinityDeparture**, **CR\_InflowToBay**, and **Ref\_3-HighFlowScrapingCriteria** worksheets. Column headers in row 10 explain what the data are. This step yields a Yes/No answer to ‘Is 6.C.(ii) met?’ in the right-most column.

**Test 6.C.(iii) Low-Salinity** – this is the second of three steps related to 6.C. Beneficial Inflow Criteria. Special Condition 6.C.(iii) is the focus here. Columns A and B assemble values from **Final\_Daily**, and **CumulativeSalinityDeparture** worksheets. Column headers in row 10 explain what the data are. This step yields a Yes/No answer to ‘Is 6.C.(iii) met?’ in the right-most column.

**Test 6.C.(iv) High-Flow Scalp** – this is the third of three steps related to 6.C. Beneficial Inflow Criteria. Special Condition 6.C.(iv) is the focus here. Columns A to N assemble values from **Final\_Daily; Wharton USGS max, min, mean; CumulativeSalinityDeparture**, and **Ref\_3-HighFlowScrapingCriteria** worksheets. Column headers in row 10 explain what the data are. Unlike the first and second steps, this step yields a Maximum diversion allowed in the right-most column.

**CR\_InflowToBay** – for all dates starting with 1/1/2018, determine the Colorado River inflow to Matagorda Bay by one of two methods.

- A. If the daily average streamflow at Bay City gage is available from USGS and it is at least 2,300 cfs, then the diversion at South Texas Nuclear Project’s diversion point for that date is subtracted and the result is the answer.
- B. Otherwise, the daily average streamflow at Wharton gage for the previous date is used, then subtract diversion Gulf Coast 2 (Lane City) for the previous date, and subtract diversions at the other two Gulf Coast division points, City of Corpus Christi, and South Texas Nuclear Project to arrive at the answer. If there is water discharged from Arbuckle Reservoir into the Colorado River on the previous date, that discharge will be added also.

Columns with daily inflow to bay, and cumulative values of ‘Preceding 30-day Colorado River Inflow to Matagorda Bay’ as well as Preceding 60-day... and Preceding 90-day... are tabulated. This information is an intermediate result.

**CumulativeSalinityDeparture** – for all dates starting with 1/1/2018, assemble the daily average salinity data from the **WestBayTripod\_Sal\_data** and **ShellfishMarkerB\_Sal\_data** worksheets. For each of these sites, the average of whatever sensor(s) that have data on those worksheets is gathered here. The Transect value is the average of both sites if both are available, or the single value if only one site has a value. This historical data has some periods with no values recorded at either site. During these periods, the Transect value is filled with interpolation between the known values. The rules in 6.C.(ii)(b)(1), (2) and (3) are used to calculate ‘Final CSD’. Also for purpose of Special Condition 6.C.(ii)(b)(4), track when CSD has been reset from a value greater than 2200 as a result of Special Condition 6.C.(ii)(b)(3)(A) or (B).

**Columbus USGS max, min, mean** – daily streamflow data from USGS that includes  
the maximum value measured on each day,  
the minimum value measured on each day, and  
the average of all values measured on each day.

**Wharton USGS max, min, mean** – daily streamflow data from USGS that includes  
the maximum value measured on each day,  
the minimum value measured on each day, and  
the average of all values measured on each day.

**Bay City USGS max, min, mean** – daily streamflow data from USGS that includes the maximum value measured on each day, the minimum value measured on each day, and the average of all values measured on each day.

**Diversions below Wharton Gage** – daily data from LCRA's Hydromet Database for diversions from the Colorado River at each of the 3 diversion points at LCRA's Gulf Coast irrigation division, the City of Corpus Christi's diversion point, and South Texas Nuclear Project's diversion point.

**WestBayTripod\_Sal\_data** – daily data from LCRA's Hydromet Database for salinity measurements in Matagorda Bay. Data for 2 sensors may be available in the future as required in Paragraph 6.F.(i)(d)(1). The Avg column is the average of both is available, or the value from the single sensor if only one is recorded.

**ShellfishMarkerB\_Sal\_data** – daily data from LCRA's Hydromet Database for salinity measurements in Matagorda Bay. Data for 2 sensors may be available in the future as required in Paragraph 6.F.(i)(d)(1). The Avg column is the average of both is available, or the value from the single sensor if only one is recorded.

**Ref\_2-SeasonalInflowCriteria** – data copied from Permit 6.C.(ii)(a) Table 2: Seasonal Inflow Criteria, reformatted

**Ref\_3-HighFlowScalpingCriteria** - data copied from Permit 6.C.(ii)(b)(4) for Continuing Drought Reset Criterion, reformatted, and Permit 6.C.(iv)(a) Table 3: Authorized diversion amounts under High-Flow Scalping, reformatted

## Appendix: Permit No. 5731, Special Condition 6.F “Accounting Plan” requirements

Water Use Permit 5731 was granted on April 29, 2001 to Lower Colorado River Authority.

Permit 5731 section 6. includes several SPECIAL CONDITIONS, including an Accounting Plan in 6.F. (text copied here for convenience).

### 6. SPECIAL CONDITIONS

#### F. Accounting Plan

(i) *Permittee shall include with any application under Special Condition 6.E.(i) to amend this Permit to authorize specific off-channel reservoirs a proposed daily accounting plan that includes, at a minimum, the following:*

- (a) *An accounting, by priority date and amount, for all water that will be diverted from the Colorado River into the off-channel reservoir(s) authorized under this Permit;*
- (b) *An accounting, by date and amount, for all water diverted from the off-channel reservoir(s) authorized under this permit;*
- (c) *An accounting, by date and amount, of water allowed to pass downstream to ensure compliance with Special Conditions 6.A., 6.B., and 6.C. related to protection of instream flows and beneficial inflows, including, at a minimum;*
  - (1) *A description of the stage data and rating information Permittee will use to determine compliance with the requirements of this Permit. In determining compliance with requirements under this permit, Permittee may rely on stage data obtained from the gaging station(s) jointly maintained by the U.S. Geological Survey (USGS) and Permittee. If the ratings used to convert stage to flow published by Permittee and the USGS are not identical at the time these requirements are implemented by Permittee, Permittee may exercise its discretion in relying on the latest updated rating of the gage(s).*
  - (2) *For purposes of determining compliance with Special Condition 6.B. ("Channel Maintenance"), flows in the Colorado River shall be measured at USGS Gage 08161000, Colorado River at Columbus, Texas, and the nearest USGS Gage located upstream of the actual diversion point of water appropriated under this permit, with appropriate adjustments, as set forth in the accounting plan, that account for travel time, downstream diversions, and lateral inflows reasonably estimated by Permittee, pursuant to a method set forth in the accounting plan, to have occurred along the Colorado River downstream of the USGS Gage 08161000, Colorado River at Columbus, Texas, and upstream of the diversion point(s) used by Permittee.*
  - (3) *For purposes of determining compliance with Special Condition 6.C., ("Beneficial*

*Inflows Criteria"), the plan shall include a description of how Permittee will determine Colorado River inflow to Matagorda Bay, including the circumstances under which Permittee will use flow measured at USGS Gage 08162500, Colorado River near Bay City, Texas, or, when appropriate, at Permittee's Lane City gage. (Permittee's Lane City gage is located on the Colorado River, Latitude 29.19028°N and Longitude - 96.0692°W, approximately 3 miles southwest of Lane City, Texas.)*

- (d) *An accounting of the salinity measurements and calculations necessary to determine compliance with Special Conditions 6.C.(ii), (iii) and (v), subject to the following requirements:*
- (1) *Beginning at such time that Permittee initiates diversions under this permit, Permittee shall measure salinity on at least an hourly basis using two salinity monitoring instruments at the West Bay @ Tripod and two salinity monitoring instruments at West Bay @ Shellfish Marker B (as identified under Special Condition 6.H).*
  - (2) *Instrument Reliability. If the daily average salinity varies by greater than 3 ppt between two instruments at the same location, Permittee shall inspect the instruments and repair or replace the instruments, if necessary, within three business days.*
  - (3) *The calculation of the average salinity across the Shellfish Marker B Transect (as defined by Special Condition 6E) shall be as follows:*
    - (A) *A daily average salinity value shall be calculated for each individual salinity monitoring instrument.*
    - (B) *The daily average salinity at the West Bay @ Tripod (as identified under Special Condition 6.1i) shall be calculated as the average of the daily average salinity for the two salinity instruments at that location; and the daily average salinity at West Bay @ Shellfish Marker B (as identified under Special Condition 6.H) shall be calculated as the average of the daily average salinity for the two salinity instruments at that location.*
    - (C) *The Shellfish Marker B Transect average salinity shall be calculated as the average of the daily average salinity at the West Bay @ Tripod and West Bay @ Shellfish Marker B locations as such locations are identified under Special Condition 6.H. However, if the salinity instruments at either the West Bay @ Tripod or West Bay @ Shellfish Marker B are outside of the range specified under Special Condition 6.F.(i)(d)(2), the transect salinity shall be established as the daily average salinity at the other location.*
    - (D) *For purposes of determining the 24-hour average salinity under Special Condition 6.C.(iii), the accounting plan shall specify the time of day at which the 24-hour period begins and ends.*

- (e) *An accounting of Permittee's calculation of Cumulative Salinity Departure, for purposes of Special Conditions 6.C.(ii)(b) and 6.C.(iv), subject, at a minimum, to the following requirements:*
- (1) *When average daily salinity at the Shellfish Marker B Transect (as defined by Special Condition 6.H) exceeds 23 ppt, the absolute value of the difference between the salinity value and 23 ppt shall be added to a running total of "Cumulative Salinity Departure" (CSD).*
  - (2) *When average daily salinity is below 23 ppt, the absolute value of the difference shall be subtracted.*
  - (3) *If the resulting CSD would otherwise be a negative value, it shall be set to zero.*
  - (4) *All CSD calculations should be done on a daily basis.*
- (ii) *Permittee shall file with any submission of a proposed accounting plan or any proposed substantive revision thereof, documentation of consultation with all entities named as parties to the contested case hearing on the application for this permit and of any comments received from those entities on the contents of the accounting plan. The Executive Director shall consider those comments in determining the adequacy of the accounting plan or any proposed substantive revision.*
- (iii) *Permittee shall maintain the approved daily accounting plan in electronic format and, except as may be restricted by other local, state, or federal law, make it available to the general public during normal business hours and to the Executive Director upon request.*
- (iv) *If at any time Permittee intends to store other waters, either from the Colorado River (authorized by other water rights) or from other previously authorized sources, for subsequent storage in and diversion from the off-channel reservoir(s) authorized under this permit, Permittee shall submit, and receive approval by the Executive Director, of a modification to the accounting plan that accounts for those additional waters prior to storing or using such supplies.*
- (v) *If Permittee seeks to modify its accounting plan, Permittee shall submit a request to the Executive Director for a determination of whether such modification requires a permit amendment, along with copies of the appropriate documents reflecting such modifications. Any modifications to the accounting plan that the Executive Director determines would change the permit terms must be submitted in the form of an application to amend the permit. If a permit amendment is required, Permittee shall not make any diversions pursuant to the modified accounting plan until a permit amendment is issued.*
- (vi) *Should Permittee fail to maintain the accounting plan, notify the Executive Director of any modifications to the accounting plan, or file an application to amend the Permit, Permittee shall immediately cease all diversions pursuant to this Permit until Permittee corrects the records, or files with the Executive Director the amended plan or, if necessary, application to amend the permit.*

## Permit 5731 Application, Narrative for Accounting Plan – Attachment to Worksheet 7, Attachment 1

In most of the worksheets, each column is a daily time series, usually with the date in Column A. Exceptions are the 'FINAL\_Annual' worksheet, and the 3 that start with "Ref..."

List of worksheets:

1. FINAL\_Daily
2. FINAL\_Annual
3. Ar buckle Res Diversions in&out
4. Test 6.A. Instream Flow
5. Ref\_1-F\_Criteria@Wharton
6. Test 6.B. Channel Maintenance
7. ChannelMaintenanceData
8. Test 6.C.(ii) Seasonal Inflow
9. Test 6.C.(iii) Low-Salinity
10. Test 6.C.(iv) High-Flow Scalp
11. CR\_InflowToBay
12. CumulativeSalinityDeparture
13. Columbus USGS max, min, mean
14. Wharton USGS max, min, mean
15. Bay City USGS max, min, mean
16. Diversions Below Wharton Gage
17. WestBayTripod Salinity Data
18. ShellfishMarkerB Salinity Data
19. Ref\_2-SeasonalInflowCriteria
20. Ref\_3-HighFlowScrapingCriteria

Each worksheet has a separate table below. Worksheet name and Brief Description are provided at the top of each table, followed by descriptive information.

1	<b>Worksheet Name: FINAL_Daily</b>		
<b>Brief description of worksheet: For the dates with Daily Diversion to or from Arbutle Reservoir authorized under Permit 5731, tabulate the and results of testing whether that diversion meets all three criteria 6.A., B., and C.</b>			
<b>Col.</b>	<b>Column Header</b>	<b>Purpose of cells</b>	<b>Data source, or example of formula in cells</b>
A	Date of diversion - enter only include those with Daily Diversion to or from Arbutle Reservoir authorized under Permit 5731	User will enter date as described in Column Header, values in all other columns on each row are for the date in this Column	User
B	Calendar Year	CY of date in Column A, to be used to sum daily to year in FINAL_Annual worksheet	Column A
C	Diversion from Colorado River into Arbutle Reservoir authorized under Permit 5731 (CFS)	Diversion as described in Column Header	Arbutle Res Diversions in&out worksheet, Column F
D	Is IF criteria in 6.A. met?	Yes/No as described in Column Header	Test 6.A. Instream Flow worksheet, Column F
E	Is Channel Maintenance requirement in 6.B. met?	Yes/No as described in Column Header	Test 6.B. Channel Maintenance worksheet, Column G
F	Is Beneficial Inflow Criteria 6.C.(ii) Seasonal Inflow met?	Yes/No as described in Column Header	Test 6.C. (ii) Seasonal Inflow worksheet, Column N
G	Is Beneficial Inflow Criteria 6.C.(iii) Low-Salinity Condition met?	Yes/No as described in Column Header	Test 6.C. (iii) Low-Salinity worksheet, Column D
H	Maximum diversion allowed under Beneficial Inflow Criteria 6.C.(iv) High-Flow Scalping. (cfs)	Limit on diversion in Column C	Test 6.C. (iv) High-Flow Scalp worksheet, Column M
I	Does Diversion in column C meet Beneficial Inflow Criteria in 6.C.(ii) or (iii) or (iv)? Meeting any one of these three is required.	Yes/No as described in Column Header	=IF(ISBLANK(\$A11))=TRUE, '-',IF(OR(F11='Yes',G11='Yes',C



J	Are all criteria met to allow this diversion into Arbuckle Reservoir under Permit 5731?	Yes/No as described in Column Header	=IF(ISBLANK(\$A11)=TRUE,'-',IF(C11=0,'no diversion into',IF(AND(D11='Yes',E11='Yes',I11='Yes'),'Yes','no')))
K	Blank		
L	Diversion from Arbuckle Reservoir authorized under Permit 5731 (CFS)	Diversion as described in Column Header (from Arbuckle Reservoir)	Arbuckle Res Diversions in&out worksheet, Column H

**Worksheet Name: FINAL\_Annual**

**Brief description of worksheet: Sum on annual basis the Daily Diversions to or from Arbutle Reservoir authorized under Permit 5731 and**

Col.	Column Header	Purpose of cells	Data source, or example of formula in cells
B	Calendar Year	starting with 2019	User
C	Diversion from Colorado River into Arbutle Reservoir authorized under Permit 5731 annual sum (Ac-Ft), must be less than authorized limit of 853,514 Ac-Ft/Yr	sum for year of daily diversions as described in Column Header	FINAL_Daily worksheet, Column C
D	Diversion from Arbutle Reservoir authorized under Permit 5731 annual sum (Ac-Ft), must be less than authorized limit of 327,591 Ac-Ft/Yr	sum for year of daily diversions as described in Column Header	FINAL_Daily worksheet, Column L

**Worksheet Name: Arbutle Res Diversions in&out**

**Brief description of worksheet: For all dates with Daily Diversion to or from Arbutle Reservoir, not just the dates with diversions authorized to tabulate the magnitude of the diversions.  
 \*\*\* LINKED to another workbook \*\*\***

<b>Col.</b>	<b>Column Header</b>	<b>Purpose of cells</b>	<b>Data source, or example of formula in cells</b>
A	Date of diversion - includes all with Daily Diversion to or from Arbutle Reservoir (not just those authorized under Permit 5731)	as described in Column Header	LINKED to another workbook
B	Total Diversion from Colorado River into Arbutle Reservoir	as described in Column Header	LINKED to another workbook
C	Diversion from Colorado River into Arbutle Reservoir from water released from Lake Travis storage	as described in Column Header	LINKED to another workbook
D	Diversion from Colorado River into Arbutle Reservoir authorized under Cert. 14-5476 with priority date Dec. 1, 1900 (up to 228,570 Ac-Ft/Yr for all diversion points combined)	as described in Column Header	LINKED to another workbook
E	Diversion from Colorado River into Arbutle Reservoir authorized under Cert. 14-5476 with priority date Nov. 1, 1987 (up to 33,930 Ac-Ft/Yr for all diversion points combined)	as described in Column Header	LINKED to another workbook
F	Diversion from Colorado River into Arbutle Reservoir authorized under Permit 5731 with priority date Feb. 28, 2001 (up to 853,514 Ac-Ft/Yr for all diversion points combined)	as described in Column Header; this value goes to FINAL_Daily worksheet, Column C	LINKED to another workbook
G	Total Diversion (Release) from Arbutle Reservoir	as described in Column Header	LINKED to another workbook

H	Diversion from Arbuckle Reservoir authorized under Permit 5731 (up to 327,591 Ac-Ft/Yr)	as described in Column Header	LINKED to another workbook
I	Comments	as described in Column Header	LINKED to another workbook

**4 Worksheet Name: Test 6.A. Instream Flow**

**Brief description of worksheet: Test whether each daily diversion in FINAL\_daily worksheet meet criteria 6.A.**

<b>Col.</b>	<b>Column Header</b>	<b>Purpose of cells</b>	<b>Data source, or example of formula in cells</b>
A	Date of diversion (assume 0 days travel time from Wharton gage to Lane City diversion point)	diversion date; Assume 0 days travel time from Wharton Gage to Lane City diversion point (aka Gulf Coast 2).	FINAL_Daily worksheet, Column A
B	WhartonStreamflow (CFS)	minimum streamflow for date in Column A	Wharton USGS max, min, mean worksheet, Column F
C	Diversions (CFS)	total diversion at Gulf Coast 2 @ Lane City Dam (not just what was diverted to Arbutckle Reservoir) for date in Column A	Diversions below Wharton Gage worksheet, Column D
D	Flow Passing Div. Pt. (CFS)	difference of Columns B - C	=IF(A11='-', '-', B11-C11)
E	IF Criteria@Wharton (CFS)	lookup of criteria for month od date in Column A	Ref_1-IF_Criteria@Wharton worksheet
F	Is IF criteria met?	compare Columns D and E; this answer go to FINAL_Daily worksheet, Column D	=IF(A11='-', '-', IF(C11=0, 'n/a', IF(D11<E11, 'No', 'Yes')))

Worksheet Name: Ref\_1-IF\_Criteria@Wharton

Brief description of worksheet: Table 1: Monthly Instantaneous Instream Flow Criteria at USGS gage 08162000, Colorado River at Wharton

Col.	Column Header	Purpose of cells	Data source, or example of formula in cells
A	Mo#	1 TO 12, used in =VLOOKUP()	User
B	Month	January to December	copied from Permit 5731
C	Flow (CFS)	criteria values	copied from Permit 5731

**6 Worksheet Name: Test 6.B. Channel Maintenance**

**Brief description of worksheet: Test whether each daily diversion in FINAL\_daily worksheet meet criteria 6.B.**

Col.	Column Header	Purpose of cells	Data source, or example of formula in cells
A	Date of diversion (assume 0 days travel time from Wharton gage to Lane City diversion point)	diversion date	FINAL_Daily worksheet, Column A
B	Most Recent Sequence number for qualifying Channel Maintenance Flow Event at Columbus	as described in Column Header	ChannelMaintenanceData worksheet, Column S
C	Last Date of qualifying Channel Maintenance Flow Event at Columbus	as described in Column Header	ChannelMaintenanceData worksheet, Column U
D	Days since that qualifying Channel Maintenance Flow Event at Columbus passed Gulf Coast's Lane City diversion point	difference of Columns A - C + 2 days for travel Columbus to Wharton	=IF(\$A11='-';'-';A11-C11+2)
E	Has qualifying Channel Maintenance Flow Event at Columbus passed Gulf Coast's Lane City diversion point within last 24 months?	compare Column D to 24 months	=IF(\$A11='-';'-';IF(D11<0,'N/A',IF(D11>2*365,'No','Yes')))
F	Was the qualifying channel maintenance flow event allowed to pass the Lane City diversion point without any diversions under this permit?	as described in Column Header	ChannelMaintenanceData worksheet, Column Z
G	Is Channel Maintenance requirement met?	verify that both Columns E and F have answer of 'Yes'; this answer go to FINAL_Daily worksheet, Column E	=IF(\$A11='-';'-';IF( AND(\$E11='Yes',\$F11='Yes'), 'YES','NO'))

**Worksheet Name: ChannelMaintenanceData**

**Brief description of worksheet: Intermediate calculations to analyze daily maximum streamflows at Columbus and Wharton gages in terms of maintenance flow event' defined in 6.B.**

Col.	Column Header	Purpose of cells	Data source, or example of formula in cells
A	USGS Date	all dates starting with 7/1/2018	User
B	Columbus Gage Maximum Daily Streamflow on USGS Date(cfs)	as described in Column Header, for date in Column A	Columbus USGS max, min, mean worksheet, Column D
C	Is this day a part of a qualifying Channel Maintenance Flow Event at Columbus? The number of event or ZERO if not event.	as described in Column Header, value of zero is non-event date, values >0 is a date of an event	=IF(OR(B11>=27000, AND( AND(ISNUMBER(C10)=TRUE,C10>0), / ), IF(C10>0,C10,MAX(C10:C\$11)+1),0)
D	First Date of qualifying Channel Maintenance Flow Event at Columbus	as described in Column Header, value of "-" is non-event date, same value for each row of an event	=IF( [@[Is this day a part of a qualifying Channel Maintenance Flow Event or ZERO if not event.]]=0,"-", IF([@[Is this day a part of a qualifying Channel Maintenance Flow Event or ZERO if not event.]]<>C10,\$A
E	Sequence number for qualifying Channel Maintenance Flow Event at Columbus	for the last date of each event, copy value from Column C to here	=IF( AND(C11>0,C12=0),C11,0)
F	Last Date of qualifying Channel Maintenance Flow Event at Columbus	as described in Column Header, value of "-" is non-event date, date value only on last row of an event	=IF( \$E11>0,MAX( (\$C\$11:\$C11=\$E11)*\$A\$11:\$A11),"-")
G	Highest streamflow of qualifying Channel Maintenance Flow Event at Columbus (cfs)	for the last date of each event; from dates with sequence number in Column C equal to Column E here, find maximum value from Column B to here	=IF( E11>0,MAX( (C\$11:C11=E11)*B\$11:B11),0)
H	Date of Highest streamflow of qualifying Channel Maintenance Flow Event at Columbus	the last date of each event; find date(s) with streamflow in Column B equal to Column G and with sequence number in	=IF(G11=0,"-";ROUND(SUMIFS(\$A\$11:\$A11,B\$11:B11,G11,C\$11:E11)/COUNT(0.01,1))



		Column C equal to Column E here	
I	Wharton Gage Maximum Daily Streamflow on USGS Date (cfs)	as described in Column Header, for date in Column A	Wharton USGS max, min, mean worksheet, Column D
J	Based on Channel Maintenance Flow Event at Columbus 2 days prior, is this a corresponding event at Wharton (0=No or the number of event)	as described in Column Header	=IF( AND( ISNUMBER(C9)=TRUE,C9>0), C9, 0)
K	Sequence number for qualifying Channel Maintenance Flow Event at Wharton	as described in Column Header	=IF( AND(J11>0,J12=0),J11,0)
L	Highest streamflow of qualifying Channel Maintenance Flow Event at Wharton (cfs)	as described in Column Header, similar to Column G but for Wharton gage	=IF( K11>0,MAX( (J\$11:J11=K11)*\$11:11),0)
M	Date of Highest streamflow of qualifying Channel Maintenance Flow Event at Wharton	as described in Column Header, similar to Column H but for Wharton gage	=IF(L11=0,',';ROUND(SUMIFS(\$A\$11:\$A11,\$11:11,L11,\$11:J11,J\$11:J11,K11),COUNTIFS(\$11:11,L11,J\$11:J11,K11)-0.01,1))
N	Diversion from Colorado River into Arbutkle Reservoir authorized under Permit 5731 (CFS)	as described in Column Header	=IFERROR(INDEX(Table_FinalDaily[[Calendar Year]:[Diversion from Arbutkle Reservoir authorized under Permit 5731 (CFS)],MATCH(A11,Table_FinalDaily[Date of diversion - Diversion to or from Arbutkle Reservoir authorized under Permit 5731],0),MATCH(Table_ChMaint[[#Headers],[Diversion from Colorado River authorized under Permit 5731 (CFS)],Table_FinalDaily[[#Headers],[Calendar Reservoir authorized under Permit 5731 (CFS)],0)),"-")
O	Wharton Gage Mean Daily Streamflow on USGS Date (cfs)	This column is 1st of 3 to be used for Test 6.c. High-Flow Scalp. Note that this is MEAN Daily, rather than MAXIMUM Daily in Column G.	Wharton USGS max, min, mean worksheet, Column H
P	1-Day >8,000 cfs mean (1=Yes)	This column is 2nd of 3 to be used for Test 6.c. High-Flow Scalp. As described in Column Header, for current date from Column A.	=IF(O11>8000,1,0)

Q	2-Days both >8,000 cfs means (1=Yes)	This column is 3rd of 3 to be used for Test 6.c. High-Flow Scalp. As described in Column Header, for current date from Column A and the date prior to that.	=IF(AND(O10>8000,P11=1),1,0)
R	Blank		
S	Sequence number for qualifying Channel Maintenance Flow Event	as described in Column Header, values 1 to 7 will be extended by user as needed	User
T	First Date of qualifying Channel Maintenance Flow Event at Columbus`	as described in Column Header, copied from Column D, for sequence number from Column S	=INDEX(Table_ChMaint,MATCH(\$S11,Table_ChMaint[Sequence number Maintenance Flow Event at Columbus],0),MATCH(T\$10,Table_ChMaint[
U	Last Date of qualifying Channel Maintenance Flow Event at Columbus	as described in Column Header, copied from Column F, for sequence number from Column S	=INDEX(Table_ChMaint,MATCH(\$S11,Table_ChMaint[Sequence number Maintenance Flow Event at Columbus],0),MATCH(U\$10,Table_ChMaint[
V	First Date of qualifying Channel Maintenance Flow Event at Gulf Coast's Lane City diversion point	as described in Column Header, copied from Column D + 2 days travel time, for sequence number from Column S	=+[@[First Date of qualifying Channel Maintenance Flow Event at Column
W	Last Date of qualifying Channel Maintenance Flow Event at Gulf Coast's Lane City diversion point	as described in Column Header, copied from Column F + 2 days travel time, for sequence number from Column S	=+[@[Last Date of qualifying Channel Maintenance Flow Event at Column
X	Sum of diversion from Colorado River @ Gulf Coast's Lane City under this permit during this event (DSF)	as described in Column Header for dates from Column V to Column W (inclusive)	=SUMIFS(Table_ChMaint[Diversion from Colorado River into Arbuttle R 5731 (CFS)],Table_ChMaint[Based on Channel Maintenance Flow Event corresponding event at Wharton ( 0=No or the number of event)],@[Se Channel Maintenance Flow Event])
Y	blank		

Z	Did the qualifying channel maintenance flow event be allowed to pass the Lane City diversion point without any diversions under this permit?	as described in Column Header, for sequence number from Column S	=IF(ISNUMBER(T11)=FALSE,"",IF(X11=0,"Yes","no"))

**8 Worksheet Name: Test 6.C. (ii) Seasonal Inflow**

**Brief description of worksheet: Test whether each daily diversion in FINAL\_daily worksheet meet criteria 6.C. (ii).**

<b>Col.</b>	<b>Column Header</b>	<b>Purpose of cells</b>	<b>Data source, or example of formula in cells</b>
A	Date of diversion (assume 0 days travel time from Wharton gage to Lane City diversion point)	diversion date	FINAL_Daily worksheet, Column A
B	Month at Wharton	Month# of date in Column A, to be used to select criteria n Column L	=month(A11)
C	7-day average salinity for the Shellfish Marker B Transect (ppt)	as described in Column Header	CumulativeSalinityDeparture worksheet, Column K
D	Is 7-day average salinity for the Shellfish Marker B Transect (ppt) < 23 ppt?	as described in Column Header, Yes or No	=IF(C11<23,'Yes','no')
E	Preceding 60-day Colorado River Inflow to Matagorda Bay (acre-feet)	as described in Column Header	CR_InflowToBay worksheet, Column R
F	Seasonal Inflow Criteria from Table 2 (acre-feet)	as described in Column Header	Ref_2-SeasonalInflowCriteria worksheet, Column C
G	Is Preceding 60-day Colorado River Inflow to Matagorda Bay (acre-feet) > Seasonal Inflow Criteria?	Compare values in Columns E and F	=IF(E11>F11,'Yes','no')
H	FINAL CSD	as described in Column Header	CumulativeSalinityDeparture worksheet, Column AB
I	Is FINAL CSD > 2,200?	as described in Column Header	=IF(H11>2200,'Yes','no')
J	Has CSD been reset from a value greater than 2200 as a result of Special Condition 6.C.(ii)(b)(3)(A) or (B) during the previous 60-day period?	as described in Column Header, Yes or No	CumulativeSalinityDeparture worksheet, Column T
K	Preceding 30-day Colorado River Inflow to Matagorda Bay (acre-feet)	as described in Column Header	CR_InflowToBay worksheet, Column Q

L	Continuing Drought Reset Criteria	as described in Column Header, value for current month	Ref_3-HighFlowScrapingCriteria, Column C in rows 5 to 16
M	Is Continuing Drought Reset Criteria is satisfied?	Compare values in Columns K and L, this does not apply if answer in Column J is No	=IF(J11='no','does not apply',IF(K11>=L11,'Yes','no'))
N	Is 6.C.(ii) met?	as described in Column Header; this answer go to FINAL_Daily worksheet, Column F	=IF(AND(D11='Yes',G11='Yes',I11='no',OR(J11='no',AND(

**Worksheet Name: Test 6.C. (iii) Low-Salinity**

**Brief description of worksheet: Test whether each daily diversion in FINAL\_daily worksheet meet criteria 6.C. (iii).**

<b>Col.</b>	<b>Column Header</b>	<b>Purpose of cells</b>	<b>Data source, or example of formula in cells</b>
A	Date of diversion (assume 0 days travel time from Wharton gage to Lane City diversion point)	diversion date	FINAL_Daily worksheet, Column A
B	FINAL Transect value for the previous day	as described in Column Header, PREVIOUS DAY IS Column A - 1	CumulativeSalinityDeparture worksheet, Column j
C	Was FINAL Transect value <= 5 ppt yesterday?	Compare values in Column B to 5	=IF(B11<=5,'Yes','no')
D	Is 6.C.(iii) met?	simply answer from Column C	=C11

**10 Worksheet Name: Test 6.C. (iv) High-Flow Scalp**

**Brief description of worksheet: Test whether each daily diversion in FINAL\_daily worksheet meet criteria 6.C. (iv).**

Col.	Column Header	Purpose of cells	Data source, or example of formula in cells
A	Date of diversion (assume 0 days travel time from Wharton gage to Lane City diversion point)	diversion date	FINAL_Daily worksheet, Column A
B	USGS 08162000 Colorado Rv at Wharton, TX; Mean Daily Streamflow (cfs)	as described in Column Header, for date in Column A	Wharton USGS max, min, mean worksheet, Column H
C	Is USGS 08162000 Colorado Rv at Wharton, TX; Daily Streamflow (cfs) > 6,000?	Compare values in Column B to 6,000; if the answer here is NO then High-Flow Scalping cannot apply and Columns E to L will display that message	=IF(B11>6000,'Yes','NO')
D	Firm customers asked to implement mandatory restrictions? (User input of Yes or No)	An input to Table 3	user
E	FINAL CSD	as described in Column Header	CumulativeSalinityDeparture worksheet, Column AB
F	Is FINAL CSD > 3,800?	Compare values in Column E to 3,800 ; answer is an input to Table 3	IF(E12>3800,'Yes',no')
G	Percentage of USGS 08162000 Colorado Rv at Wharton, TX; Daily Streamflow (cfs) ABOVE 6,000 CFS that Permittee is authorized to divert, under this permit, on a daily average basis.	Criteria from Table 3 on Ref_3-HighFlowScrapingCriteria worksheet, inputs are Columns D and F	=IF(UPPER([@[Is USGS 08162000 Colorado Rv at Wharton 6,000 ?]])<>"YES","High-Flow Scalping can not apply", INDEX(HighFlowScrapingCriteria!\$B\$23:\$C\$24,MATCH( [@[Firm c mandatory restrictions ? (User input of Yes or No)]],Ref_3-HighFlowScrapingCriteria!\$A\$23:\$A\$24,0),MATCH([@[Is FI HighFlowScrapingCriteria!\$B\$22:\$C\$22,0])) )
H	Blank		
I	Blank2		
J	Blank3		

K	Has a high-flow 2-day pulse of USGS Gage 08162000, Colorado River at Wharton, Texas occurred during last 18 months? (Yes/No)	as described in Column Header	ChannelMaintenanceData worksheet, Column O
L	Must diversions be limited to not reduce daily average flow below 8,000 cfs at the diversion point?	as described in Column Header, see Permit paragraph 6.C.(iv)(b)	IF(K12='Yes','NO','Yes')
M	Maximum diversion allowed under 6.C.(iv). (cfs)	as described in Column Header, see Permit paragraphs in 6.C.(iv)	=IF(UPPER([@[Is USGS 08162000 Colorado Rv at Wharton 6,000 ?]])<>'YES';0,MIN(MAX( 0,(B12-6000)*G12), IF(L12=8000),99999999)))



<b>Worksheet Name: CR_InflowToBay</b>			
<b>Brief description of worksheet: Intermediate calculations to analyze daily streamflow from Colorado River into Matagorda Bay, uses Wharton diversions downstream of Wharton Gage</b>			
<b>Col.</b>	<b>Column Header</b>	<b>Purpose of cells</b>	<b>Data source, or example of formula in cells</b>
A	Date for Flow at Wharton Gage, same as Date of diversion (assume 0 days travel time from Wharton gage to Lane City diversion point)	all dates starting with 12/31/2017	User
B	Wharton Gage Mean Daily Streamflow (cfs)	as described in Column Header, for date in Column A	Wharton USGS max, min, mean worksheet, Column H
C	GC Plant 2 Diversion {on Wharton Date} (cfs)	as described in Column Header, @ Lane City Dam (Div Pt 1 in Cert), for date in Column A	Diversions below Wharton Gage worksheet, Column D
D	Total Lane City River Return {on Wharton Date} (cfs)	as described in Column Header, @ Lane City Dam (Div Pt 1 in Cert), for date in Column A	Diversions below Wharton Gage worksheet, Column H
E	Corpus Christi Diversion {on Bay City Date} (cfs)	as described in Column Header, for date in Column H	Diversions below Wharton Gage worksheet, Column F
F	GC Plant 1 Diversion {on Bay City Date} (cfs)	as described in Column Header, @ Bay City Dam to east (Div Pt 2 in Cert), for date in Column H	Diversions below Wharton Gage worksheet, Column C
G	GC Plant 3 Diversion {on Bay City Date} (cfs)	as described in Column Header, @ Bay City Dam to west (Div Pt 3 in Cert), for date in Column H	Diversions below Wharton Gage worksheet, Column E
H	Date for Flow at Bay City Gage	date in Column A +1	=\$A11+1
I	Bay City Gage Mean Daily Streamflow (cfs)	as described in Column Header, for date in Column H, value of -1 below indicates that date is not in Bay City USGS max, min, mean worksheet	Bay City USGS max, min, mean worksheet, Column H

J	South Tx Project Diversion {on Bay City Date} (cfs)	as described in Column Header, for date in Column H	Diversions below Wharton Gage worksheet, Column G
K	Colorado River Inflow to Matagorda Bay using Wharton Gage Streamflow plus Arbutckle River return minus all listed Diversions (cfs)	as described in Column Header, Use Wharton Gage based value if Bay City Gage value is less than 2,300 cfs	=IF( OR(\$I11>\$H\$4, ISNUMBER(\$B11)=FALSE),'use Bay \$D11 + -\$C11 -\$E11-\$F11-\$G11-\$J11)
L	Colorado River Inflow to Matagorda Bay using Bay City Gage Streamflow minus South Tx Project Diversion (cfs)	as described in Column Header, Use Bay City Gage value only if mean is greater or equal to 2,300 cfs	=IF( OR(\$I11<\$H\$4,ISNUMBER(\$I11)=FALSE),'use Whar \$J11)
M		blank	
N		blank	
O	Date at Bay	date in Column A + 2 (assume 1 day travel time from Bay City Gage to Bay	=\$A11+2
P	daily CR_Inflow to Bay (AF)	value from Column K or L (only one will have a value) converted from CFS to Ac-Ft	=ROUND(1.9835 *MAX(K11,L11),0)
Q	30-day CR_Inflow to Bay (AF)	as described in Column Header, sum Column P for previous 30 days	cell is blank for first 30 days, then SUM(\$P11:\$P40)
R	60-day CR_Inflow to Bay (AF)	as described in Column Header, sum Column P for previous 60 days	cell is blank for first 60 days, then SUM(\$P11:\$P70)
S	90-day CR_Inflow to Bay (AF)	as described in Column Header, sum Column P for previous 90 days	cell is blank for first 90 days, then SUM(\$P11:\$P100)

**12 Worksheet Name: CumulativeSalinityDeparture**

Brief description of worksheet: Intermediate calculations to analyze daily salinity data from two sites in Matagorda Bay and CR_InflowToEB Salinity Departure (CSD)			
Col.	Column Header	Purpose of cells	Data source, or example of formula in cells
A	Date at Bay	all dates starting with 1/1/2018	User
B	West Bay Tripod	average daily salinity (ppt) at West Bay Tripod	WestBay Tripod Salinity data worksheet, Column E (the average)
C	SMB	average daily salinity (ppt) at Shellfish Marker B	ShellfishMarkerB Salinity data worksheet, Column E (the average)
D	Transect	Average of Columns B and C, if one does not have data use the other, if neither have data will result in #DIV/0! Error message	=AVERAGE(B11,C11)
E	count of consecutive days without Transect value	as described in Column Header, shows zero if Column D has a value, otherwise is previous value + 1	=IF(ISNUMBER(D11)=TRUE,0,1+E10)
F	last known Transect value	as described in Column Header, shows zero if Column E is a zero	=IF(\$E11=0,0,IF(\$E11=1,\$D10,F10))
G	next known Transect value	as described in Column Header, shows zero if Column E is a zero	=IF(\$E11=0,0,IF(\$E12=0,\$D12,G12))
H	number of consecutive days without Transect value in this group	as described in Column Header	=IF(\$E11=0,0,IF(\$E12=0,\$E11,H12))
I	interpolated Transect value	as described in Column Header, historical data has some days with no data so interpolation is necessary	=IF( H11>30, '> 30 days missing',IF( (1+H11),2)))
J	FINAL Transect value	use value from Column D if available, otherwise use Column I (interpolated)	=IF(I11='-',D11,I11)
K	7-day average salinity for the Shellfish Marker B Transect (ppt)	as described in Column Header, uses values from Column K	=IFERROR(AVERAGE(J11:J17),'not available')

L		blank	
M	Preliminary CSD, without resets	<p>preliminary CSD is calculated according to 6. F. (i) (e)</p> <p>(1) When average daily salinity at the Shellfish Marker B Transect (as defined by Special Condition 6.H) exceeds 23 ppt, the absolute value of the difference between the salinity value and 23 ppt shall be added to a running total of "Cumulative Salinity Departure" (CSD).</p> <p>(2) When average daily salinity is below 23 ppt, the absolute value of the difference shall be subtracted.</p> <p>(3) If the resulting CSD would otherwise be a negative value, it shall be set to zero.</p> <p>(4) All CSD calculations should be done on a daily basis.</p>	=MAX(0,M10+J11-23)
N	Preceding 90-day Colorado River Inflow to Matagorda Bay (acre-feet)	as described in Column Header, for date in Column A	CR_InflowToBay worksheet, Column S
O	Reset CSD according to 6.C.(ii) (b) (3) (A) 90-day Bay inflow criteria (Yes/No/ - )	as described in Column Header	=IF(N11='n/a', '- ',IF(N11>=IF(AND(MONTH(\$A11)>=3,MONTH(\$A11)<=10),S
P		blank	
Q	Preceding 90-day Transect Salinity (ppt)	as described in Column Header	cell has 'n/a' for first 90 days, then = IF(ISNUMBER(J100)=F IF(ISNUMBER(J11)=TRUE,ROUND(AVERAGE(J11:J100),2

R	Reset CSD according to 6.C.(ii)(b)(3) (B) 90-day Transect Salinity criteria (Yes/No/ - )	as described in Column Header	= IF(ISNUMBER(Q11)=FALSE,'-', IF(Q11<= 15,'Yes','No'))
S	Has CSD been reset from a value greater than 2200 as a result of Special Condition 6.C.(ii)(b)(3)(A) or (B) this date? {1=Yes, 0=No }	as described in Column Header	=IF(AND(\$M11>2200,OR(\$O11='Yes',\$R11='Yes')),1,0)
T	Has CSD been reset from a value greater than 2200 as a result of Special Condition 6.C.(ii)(b)(3)(A) or (B) during the previous 60-day period?	as described in Column Header	cell has 'does not apply first 60 days' for first 60 days, then =IFERROR(IF(SUM(S11:S70)>0,'Yes','no'),'n/a')
U		blank	
V		blank	
W	the 2nd preceding 90-day (days 91 to 180) Colorado River Inflow to Matagorda Bay (acre-feet)	as described in Column Header, for date in Column A - 90	CR_InflowToBay worksheet, Column S
X	Lesser of the preceding two consecutive 90-day Colorado River Inflow to Matagorda Bay (acre-feet)	as described in Column Header	=MIN(N11,W11)
Y	Reset CSD according to 6.C.(ii)(b)(3)(C) CR Inflow to Bay for each of two preceding 90-day periods >= 310,000 AF (Yes/No/ - )	as described in Column Header	=IF(ISNUMBER(X11)=FALSE,'-',IF(X11<310000,'No','Yes'))
Z		blank	

AA	Reason for reset	<p>Permit section 6.C.(ii)(b)(3) lists 3 reasons for resetting CSD to zero,</p> <p>(A) Total Colorado River inflows into Matagorda Bay for a 90-day period that ends on any day during the following calendar months are greater than or equal to the corresponding values:</p> <p>i.) March-October: 430,000 acre-feet;</p> <p>ii.) November-February: 410,000 acre-feet.</p> <p>(B) The average salinity at the Shellfish Marker B Transect (as defined by Special Condition 6.H) over the preceding 90-day period is 15 ppt or less; or</p> <p>(C) Total Colorado River inflows to Matagorda Bay for the preceding two consecutive 90-day periods are greater than or equal to 310,000 acre-feet for each such period.</p>	<p>=IF(AND(\$O11&lt;&gt;'Yes',\$R11&lt;&gt;'Yes',\$Y11&lt;&gt;'Yes'),'none',AND(\$O11='Yes',\$R11='Yes'),'') &amp;IF(\$R11='Yes','B',OR(\$O11='Yes',\$R11='Yes'),\$Y11='Yes'),'') &amp;IF(\$Y11='</p>
AB	Final CSD	<p>as described in Column Header, similar to Column M except with possible resets to zero for reasons in Column AA</p>	<p>=IF(OR(\$O11='Yes',\$R11='Yes',\$Y11='Yes'),0,MAX(0,AB10</p>

**13 Worksheet Name: Columbus USGS max, min, mean**

**Brief description of worksheet: Columbus Gage streamflow Daily Maximum, minimum, and mean values from USGS**

Col.	Column Header	Purpose of cells	Data source, or example of formula in cells
A	blank		
B	Date#	date from Column C, just in format mm/dd/yyyy	=[@DateTime]*1
C	DateTime	date in format yyyy-mm-dd	not linked, user entered data by copy and paste from file cre
D	Maximum	maximum measurement recorded for Date	not linked, user entered data by copy and paste from file cre
E	Max qualification code	Qualification codes included in this output: A Approved for publication -- Processing and review completed. P Provisional data subject to revision. e Value has been estimated.	not linked, user entered data by copy and paste from file cre
F	Minimum	minimum measurement recorded for Date	not linked, user entered data by copy and paste from file cre
G	Min qualification code	same as Column E	not linked, user entered data by copy and paste from file cre
H	Mean	mean of all measurements recorded for Date	not linked, user entered data by copy and paste from file cre
I	Mean qualification code	same as Column E	not linked, user entered data by copy and paste from file cre

**14 Worksheet Name: Wharton USGS max, min, mean**

**Brief description of worksheet: Wharton Gage streamflow Daily Maximum, minimum, and mean values from USGS**

Col.	Column Header	Purpose of cells	Data source, or example of formula in cells
A	Blank		
B	Date#	date from Column C, just in format mm/dd/yyyy	=[@DateTime]*1
C	DateTime	date in format yyyy-mm-dd	not linked, user entered data by copy and paste from file cre
D	Maximum	maximum measurement recorded for Date	not linked, user entered data by copy and paste from file cre
E	Max qualification code	Qualification codes included in this output: A Approved for publication -- P Provisional data subject to revision. e Value has been estimated.	not linked, user entered data by copy and paste from file cre
F	Minimum	minimum measurement recorded for Date	not linked, user entered data by copy and paste from file cre
G	Min qualification code	same as Column E	not linked, user entered data by copy and paste from file cre
H	Mean	mean of all measurements recorded for Date	not linked, user entered data by copy and paste from file cre
I	Mean qualification code	same as Column E	not linked, user entered data by copy and paste from file cre



**15 Worksheet Name: Bay City USGS max, min, mean**

**Brief description of worksheet: Bay City Gage streamflow Daily Maximum, minimum, and mean values from USGS. Many dates with no m will be missing in this table.**

Col.	Column Header	Purpose of cells	Data source, or example of formula in cells
A	Blank		
B	Date#	date from Column C, just in format mm/dd/yyyy	=+[@DateTime]*1
C	DateTime	date, starting with 2017-12-31, in format yyyy-mm-dd	not linked, user entered data by copy and paste from file cre
D	Maximum	maximum measurement recorded for Date	not linked, user entered data by copy and paste from file cre
E	Max qualification code	Qualification codes included in this output: A Approved for publication -- P Provisional data subject to revision. e Value has been estimated.	not linked, user entered data by copy and paste from file cre
F	Minimum	minimum measurement recorded for Date	not linked, user entered data by copy and paste from file cre
G	Min qualification code	same as Column E	not linked, user entered data by copy and paste from file cre
H	Mean	mean of all measurements recorded for Date	not linked, user entered data by copy and paste from file cre
I	Mean qualification code	same as Column E	not linked, user entered data by copy and paste from file cre

**16 Worksheet Name: Diversions below Wharton Gage**

**Brief description of worksheet: Diversions from, and return flow to, Colorado River downstream of Wharton Gage. This data are from LCFP \*\*\* LINKED to another workbook \*\*\***

<b>Col.</b>	<b>Column Header</b>	<b>Purpose of cells</b>	<b>Data source, or example of formula in cells</b>
A	Date	starting with 1/1/2018	LINKED to another workbook
B	Gulf Coast Diversion	Total of all three Gulf Coast plants listed to the right, daily average in CFS	LINKED to another workbook
C	Gulf Coast1 Diversion	@ Bay City Dam to east (Div Pt 2 in Cert), daily average in CFS	LINKED to another workbook
D	Gulf Coast2 Diversion	@ Lane City Dam (Div Pt 1 in Cert), daily average in CFS	LINKED to another workbook
E	Gulf Coast3 Diversion	@ Bay City Dam to west (Div Pt 3 in Cert), daily average in CFS	LINKED to another workbook
F	Corpus Christi Diversion	daily average in CFS	LINKED to another workbook
G	STP Diversion	daily average in CFS	LINKED to another workbook
H	Total Lane City River Return (cfs)	daily average in CFS	LINKED to another workbook

**Worksheet Name: WestBayTripod Salinity data**

**Brief description of worksheet: Salinity (ppt) data for up to 2 sensors at West Bay Tripod. This data are from LCRA database.  
 \*\*\* LINKED to another workbook \*\*\***

Col.	Column Header	Purpose of cells	Data source, or example of formula in cells
A	Sensor Number	6990 is West Bay Tripod site number	LINKED to another workbook
B	Date	start with 1/1/2018	LINKED to another workbook
C	Sensor1	daily average for Sensor1	LINKED to another workbook
D	Sensor2	daily average for Sensor2	LINKED to another workbook
E	Avg	average of Sensor1 and Sensor2	LINKED to another workbook

**18 Worksheet Name: ShellfishMarkerB Salinity data**

**Brief description of worksheet: Salinity (ppt) data for up to 2 sensors at Shellfish Marker B. This data are from LCRA database.  
 \*\*\* LINKED to another workbook \*\*\***

<b>Col.</b>	<b>Column Header</b>	<b>Purpose of cells</b>	<b>Data source, or example of formula in cells</b>
A	Sensor Number	6985 is Shellfish Marker B site number	LINKED to another workbook
B	Date	start with 1/1/2018	LINKED to another workbook
C	Sensor1	daily average for Sensor1	LINKED to another workbook
D	Sensor2	daily average for Sensor2	LINKED to another workbook
E	Avg	average of Sensor1 and Sensor2	LINKED to another workbook

**Worksheet Name: Ref\_2-SeasonalInflowCriteria**

**Brief description of worksheet: Table 2: Seasonal Inflow Criteria (monthly) from Permit**

Col.	Column Header	Purpose of cells	Data source, or example of formula in cells
A	Mo#	month number 1 to 12	not linked, user entered data by copy and paste from Permit
B	Diversion occurring on any day during the months	name of month January to December	not linked, user entered data by copy and paste from Permit
C	Minimum preceding 60 day inflow (acre-feet)	values	not linked, user entered data by copy and paste from Permit

**Worksheet Name: Ref\_3-HighFlowScrapingCriteria**

**Brief description of worksheet: This contains two tables from Permit. Continuing Drought Reset Criteria form 6.C.(ii)(b)(4), and Table 3: Authorized diversion amounts under High-Flow Scalping**

Col.	Column Header	Purpose of cells	Data source, or example of formula in cells
A	Month number in Rows 4 to 16 for Continuing Drought Reset Criteria form 6.C.(ii)(b)(4); Status under Permittee's Adopted Drought Contingency Plan in Rows 22 to 25 for Table 3	Rows 4 to 16 used on Test 6.C.(ii) Seasonal Inflow worksheet Column L; Rows 22 to 25 used on Test 6.C.(iv) High-Flow Scalp worksheet Column G	not linked, user entered data by copy and paste from Permit
B	Month names in Rows 4 to 16; Answer to is CSD > 3,800? No in Rows 22 to 25	Rows 4 to 16 used on Test 6.C.(ii) Seasonal Inflow worksheet Column L; Rows 22 to 25 used on Test 6.C.(iv) High-Flow Scalp worksheet Column G	not linked, user entered data by copy and paste from Permit
C	Minimum preceding 30 day inflow (acre-feet) in Rows 4 to 16; Answer to is CSD > 3,800? Yes, in Rows 22 to 25	Rows 4 to 16 used on Test 6.C.(ii) Seasonal Inflow worksheet Column L; Rows 22 to 25 used on Test 6.C.(iv) High-Flow Scalp worksheet Column G	not linked, user entered data by copy and paste from Permit

## **Worksheet 7**

### **Attachment 2:**

#### **Accounting Plan – Excel File**

## **Worksheet 8**

### **Application/Filing Fee Worksheet**






## **Worksheet 2**

### **Attachment 1:**

#### **Inundated Area Deeds**

**OCL-01**

  
Doc ID: 003109630009 Type: OFF  
Kind: DEED  
Recorded: 06/05/2013 at 03:00:38 PM  
Fee Amt: \$48.00 Page 1 of 9  
Wharton, TX  
Sandra K. Sanders County Clerk  
File# 2013-00003250  
BK **923** PG **919-927**

Space Above This Line Reserved For Recording Data

**NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.**

GF#2012-1160

### Special Warranty Deed

**Date:** Effective as of June 4, 2013

**Grantor:** **JEAN REID SEVERN**, owning the hereinafter described property as a part of my separate property and estate and having a homestead on premises other than those hereinafter described

**Grantor's Mailing Address:**

601 Buckeye Trail  
West Lake Hills, Texas 78746  
Travis County

**Grantee:** **LOWER COLORADO RIVER AUTHORITY**, a political subdivision of the State of Texas

**Grantee's Mailing Address:**

P.O. Box 220  
Austin, Texas 78767  
Travis County

**Consideration:**

Cash and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged.

**Property (including any improvements):**

Being a 188.771 Acre Tract of Land Situated in Sylvanus Castleman Survey No.5, Abstract No. 12, in Wharton County, Texas, said 188.771 acre tract of land being a portion of Block 71, Re-subdivision of lands of Missouri-Lincoln Trust Company, as Recorded in Volume 37, Page 640 of the Deed Records of Wharton County, Texas (D.R.W.C.T.), said 188.771 acre tract of land being all of tract three, a 188.69 acre tract of land (By Deed), described in Deed from Joan Reid Anderson and husband, Keith Anderson to Jean Reid Severn, executed November 1, 1979, Recorded in Volume 525, Page 612, D.R.W.C.T., said 188.771 acre tract of land being more particularly described on **EXHIBIT "A"** attached hereto and made a part hereof for all purposes.

**Reservations from Conveyance:** None.

**Exceptions to Conveyance and Warranty:**

1. Standby fees, taxes and assessments by any taxing authority for the current year, and subsequent years; and subsequent taxes and assessments by any taxing authority for prior years due to change in land usage or ownership, but not those taxes or assessments for prior years because of an exemption granted to a previous owner of the property under Section 11.13, Texas Tax Code, or because of improvements not assessed for a previous tax year.
2. Any visible or apparent roadway or easement over or across the subject property, the existence of which does not appear of record.
3. Easement for outfall ditch across Block 71 as shown in instrument from J.J. Pendergrass, et ux to Wharton County, dated January 12, 1948 and filed in Volume 203, page 109, Deed Records of Wharton County, Texas.
4. That certain royalty interest, as conveyed in perpetuity in instrument dated December 22, 1933, executed by Wharton Development Co. in favor of M.D. Ball, recorded in Volume 106, Page 149 of the Wharton County Deed Records.
5. That certain mineral interest, the royalties, bonuses, rentals and all other rights in connection with said mineral rights, as devised to J.N. Pendergrass in the Last Wills & Testament of J.J. Pendergrass and Ermine Pendergrass, both deceased.
6. That certain mineral interest, the royalties, bonuses, rentals and all other rights in connection with said mineral rights, as reserved in perpetuity in instrument dated October 19, 1979, executed by Joan Reid Anderson in favor of Jean Reid Severn, recorded in Volume 525, Page 612 of the Deed Records of Wharton County, Texas.

Grantor, for the Consideration and subject to the Reservations from Conveyance and the Exceptions to Conveyance and Warranty, grants, sells, and conveys to Grantee the Property, together with all and singular the rights and appurtenances thereto in any way belonging, to have and to hold it to Grantee and Grantee's heirs, successors, and assigns forever. Grantor binds Grantor and Grantor's heirs and successors to warrant and forever defend all and singular the Property to Grantee and Grantee's heirs, successors, and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof when the claim is by, through, or under Grantor but not otherwise, except as to the Reservations from Conveyance and the Exceptions to Conveyance and Warranty.

When the context requires, singular nouns and pronouns include the plural.

  
JEAN REID SEVERN

STATE OF TEXAS )

COUNTY OF WHARTON )

This instrument was acknowledged before me on 4 day of June, 2013, by JEAN REID SEVERN.



*Christine D. Evanicky*  
Notary Public, State of Texas

PREPARED IN THE OFFICE OF AND  
AFTER RECORDING RETURN TO:

Duckett, Boulogny & Collins, LLP  
207 W. Jackson  
P.O. Box 1567  
El Campo, TX 77437  
Tel: (979) 543-6845  
Fax: (979) 543-9516

Y:\STU Clients\Severn.Jean\2012.08.RE.LCRA.JAB\Special Warranty Deed.WPD

EXHIBIT " A "

**BEING A 188.771 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12, IN WHARTON COUNTY, TEXAS, SAID 188.771 ACRE TRACT OF LAND BEING A PORTION OF BLOCK 71, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 188.771 ACRE TRACT OF LAND BEING ALL OF TRACT THREE, A 188.69 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM JOAN REID ANDERSON AND HUSBAND, KEITH ANDERSON TO JEAN REID SEVERN, EXECUTED NOVEMBER 1, 1979, RECORDED IN VOLUME 525, PAGE 612, D.R.W.C.T., SAID 188.771 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:**

**BEGINNING** at a calculated point (Grid Coordinates N=9,696,358.66 US Feet, E=3,663,395.21 US Feet) for the north corner of said Tract Three and for the west corner of a 188.90 acre tract of land (by deed), described in deed from John W. Williams and Kimberly J. Williams to Greg A. Koenig and Ronald C. Koenig, executed February 19, 2008, recorded in Volume 733, Page 743 of the Official Records of Wharton County, Texas, (O.R.W.C.T.), said point being in the northwest line of said Block 71 and in the southeast line of Block 70 of said Re-Subdivision of lands of Missouri-Lincoln Trust Company, said point also being in the approximate centerline of a 44 foot wide road dedication as shown on said Re-Subdivision of lands of Missouri-Lincoln Trust Company plat, currently known as County Road No. 116 (a/k/a Henry Road);

**THENCE** South 30 degrees 18 minutes 21 seconds East, with the northeast line of said Tract Three and with the southwest line of said 188.90 acre tract of land, passing at a distance of 0.59 feet, a 5/8 inch iron rod (disturbed) found for reference, passing at a distance of 30.57 feet, a 5/8 inch iron rod with cap stamped "5319" found for reference, passing at a distance of 1563.69 feet, a 5/8 inch iron rod with cap stamped "5319" found for reference, passing at a distance of 3300.59 feet, a 5/8 inch iron rod with cap stamped "5319" found for reference, in all, a distance of 4151.32 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the east corner of said Tract Three and for the south corner of said 188.90 acre tract of land, said 5/8 inch iron rod with cap stamped "GORRONDONA" being in the northwest line of a 562.205 acre tract of land (by deed), described in deed from Maxim Productions Co., LP to DCVK Limited Partnership, executed May 9, 2005, recorded in Volume 607, Page 247, O.R.W.C.T., said 5/8 inch iron rod with cap stamped "GORRONDONA" also being in the southeast line of said Block 71 and in the northwest line of Block 104, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company;

**THENCE** South 59 degrees 42 minutes 23 seconds West, with the southeast line of said Tract Three, with the southeast line of said Block 71, with the northwest line of said 562.205 acre tract of land, and with the northwest line of said Block 104, passing at a distance of 1868.89 feet, a 1/2 inch iron pipe with cap stamped "KALKOMEY" found for reference, in all, a distance of 1944.02 feet to a calculated point in the approximate centerline of Jarvis Creek, said point being in the southwest line of said Block 104, in the southeast line of Block 102, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, and also being in an interior line of Tract I, a 1059.68 acre tract of land (by deed), described in deed from Henderson Farms, Inc., to Caravelas Company, N.V., executed January 3, 1977, recorded in Volume 491, Page 186, D.R.W.C.T.;

**THENCE**, with an interior line of said Tract Three, with an interior line of said Tract 1, and with the approximate centerline of Jarvis Creek, the following fifty-seven (57) courses:

1. North 19 degrees 37 minutes 43 seconds West, a distance of 122.89 feet to a point for corner;
2. North 57 degrees 13 minutes 23 seconds West, a distance of 88.10 feet to a point for corner;
3. North 86 degrees 55 minutes 06 seconds West, a distance of 61.34 feet to a point for corner;
4. North 29 degrees 00 minutes 14 seconds West, a distance of 94.99 feet to a point for corner;
5. North 40 degrees 54 minutes 30 seconds West, a distance of 50.74 feet to a point for corner;
6. North 74 degrees 08 minutes 20 seconds West, a distance of 72.88 feet to a point for corner;
7. North 33 degrees 38 minutes 43 seconds West, a distance of 77.27 feet to a point for corner;

8. North 01 degree 24 minutes 32 seconds East, a distance of 86.52 feet to a point for corner;
9. North 02 degrees 30 minutes 20 seconds West, a distance of 82.42 feet to a point for corner;
10. North 63 degrees 51 minutes 24 seconds East, a distance of 46.39 feet to a point for corner;
11. North 14 degrees 07 minutes 01 second East, a distance of 93.88 feet to a point for corner;
12. North 13 degrees 01 minute 03 seconds West, a distance of 87.59 feet to a point for corner;
13. North 29 degrees 17 minutes 13 seconds West, a distance of 100.34 feet to a point for corner;
14. North 09 degrees 46 minutes 18 seconds East, a distance of 111.53 feet to a point for corner;
15. North 86 degrees 53 minutes 25 seconds East, a distance of 47.89 feet to a point for corner;
16. North 00 degrees 08 minutes 02 seconds West, a distance of 128.00 feet to a point for corner;
17. North 00 degrees 02 minutes 45 seconds East, a distance of 73.15 feet to a point for corner;
18. North 16 degrees 28 minutes 27 seconds West, a distance of 109.57 feet to a point for corner;
19. North 00 degrees 52 minutes 20 seconds West, a distance of 55.77 feet to a point for corner;
20. North 53 degrees 06 minutes 12 seconds West, a distance of 85.79 feet to a point for corner;
21. North 01 degree 08 minutes 11 seconds West, a distance of 44.70 feet to a point for corner;
22. North 51 degrees 48 minutes 51 seconds West, a distance of 29.81 feet to a point for corner;
23. North 71 degrees 20 minutes 36 seconds West, a distance of 37.18 feet to a point for corner;
24. South 84 degrees 57 minutes 55 seconds West, a distance of 44.22 feet to a point for corner;
25. South 65 degrees 43 minutes 19 seconds West, a distance of 129.72 feet to a point for corner;
26. South 67 degrees 05 minutes 20 seconds West, a distance of 108.75 feet to a point for corner;
27. North 88 degrees 57 minutes 14 seconds West, a distance of 77.31 feet to a point for corner;
28. North 75 degrees 27 minutes 32 seconds West, a distance of 92.30 feet to a point for corner;
29. North 81 degrees 40 minutes 25 seconds West, a distance of 130.28 feet to a point for corner;
30. North 80 degrees 36 minutes 22 seconds West, a distance of 135.33 feet to a point for corner;
31. North 59 degrees 31 minutes 40 seconds West, a distance of 34.36 feet to a point for corner;
32. South 87 degrees 01 minute 53 seconds West, a distance of 46.12 feet to a point for corner;

33. North 39 degrees 23 minutes 46 seconds West, a distance of 67.81 feet to a point for corner;
34. North 06 degrees 59 minutes 08 seconds West, a distance of 120.00 feet to a point for corner;
35. North 05 degrees 16 minutes 16 seconds East, a distance of 74.70 feet to a point for corner;
36. North 03 degrees 56 minutes 55 seconds East, a distance of 153.86 feet to a point for corner;
37. North 27 degrees 22 minutes 19 seconds East, a distance of 126.62 feet to a point for corner;
38. North 82 degrees 20 minutes 02 seconds East, a distance of 29.00 feet to a point for corner;
39. North 14 degrees 20 minutes 05 seconds East, a distance of 77.99 feet to a point for corner;
40. North 16 degrees 30 minutes 02 seconds West, a distance of 116.16 feet to a point for corner;
41. North 39 degrees 44 minutes 27 seconds West, a distance of 107.71 feet to a point for corner;
42. North 25 degrees 03 minutes 07 seconds West, a distance of 106.82 feet to a point for corner;
43. North 10 degrees 07 minutes 00 seconds West, a distance of 67.56 feet to a point for corner;
44. North 17 degrees 24 minutes 47 seconds West, a distance of 138.99 feet to a point for corner;
45. North 24 degrees 02 minutes 21 seconds West, a distance of 118.86 feet to a point for corner;
46. North 39 degrees 37 minutes 15 seconds West, a distance of 69.33 feet to a point for corner;
47. North 60 degrees 44 minutes 04 seconds West, a distance of 85.28 feet to a point for corner;
48. North 80 degrees 34 minutes 22 seconds West, a distance of 141.05 feet to a point for corner;
49. North 80 degrees 57 minutes 58 seconds West, a distance of 74.19 feet to a point for corner;
50. North 60 degrees 18 minutes 44 seconds West, a distance of 183.95 feet to a point for corner;
51. North 09 degrees 20 minutes 23 seconds West, a distance of 135.19 feet to a point for corner;
52. North 07 degrees 06 minutes 59 seconds West, a distance of 160.38 feet to a point for corner;
53. North 06 degrees 02 minutes 26 seconds West, a distance of 118.89 feet to a point for corner;
54. North 48 degrees 32 minutes 13 seconds West, a distance of 149.25 feet to a point for corner;
55. South 89 degrees 52 minutes 18 seconds West, a distance of 198.90 feet to a point for corner;
56. North 18 degrees 38 minutes 44 seconds West, a distance of 79.27 feet to a point for corner;




57. North 28 degrees 01 minute 51 seconds West, a distance of 58.58 feet to a calculated point for the west corner of said Tract Three and for an interior ell corner of said Tract I, said calculated point being the west corner of said Block 71 and the north corner of said Block 102, said calculated point also being in the southeast line of said Block 70;

**THENCE** North 59 degrees 50 minutes 29 seconds East, with the north line of said Tract Three, with an interior line of said Tract I, with the north line of said Block 71, and with the south line of said Block 70, passing at a distance of 50.00 feet, a 5/8 inch iron rod with cap stamped "GORRONDONA" set for reference, passing at a distance of 1964.13 feet, a 5/8 inch iron rod found for an exterior ell corner of said Tract I and for the south corner of a 277.33 acre tract of land (by deed), described in deed from F. D. Gavranovic to F. D. Gavranovic, Jr., executed October 29, 1977, recorded in Volume 255, Page 813, O.R.W.C.T., continuing in all, a distance of 2209.82 feet to the **POINT OF BEGINNING**, and containing 188.771 acres of land, more or less.

Bearing Basis: Texas Lambert Grid, Central Zone, NAD83/NSRS2007.

All distances are surface values and in U. S. Survey Feet. To compute grid values multiply surface distances by a Combined Scale Factor of 1.00037640.

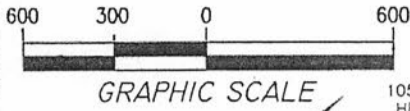
The field notes and the plat attached hereto represent an on-the-ground survey made under my direct supervision during the months of September 2012 to November 2012.



Thomas Cargill  
Registered Professional Land Surveyor No. 5835  
Gorrondona and Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933

Word File: LCRAW114A-0007B.DOC  
Drawing File: LCRAW114A-0007B.DWG

WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12



GRAPHIC SCALE

TRACT I  
 1059.68 ACRES (BY DEED)  
 HENDERSON FARMS, INC.  
 TO  
 CARAVELAS COMPANY, N.V.  
 VOLUME 491, PAGE 186  
 JANUARY 3, 1977  
 D.R.W.C.T.  
 44' ROAD DEDICATION  
 RE-SUBDIVISION MISSOURI-LINCOLN  
 TRUST COMPANY  
 VOLUME 37, PAGE 640  
 D.R.W.C.T.

- 12/18/2012
- LEGEND**
- IRON PIPE FOUND (SIZE NOTED)
  - 5/8" IRON ROD WITH CAP
  - △ STAMPED "GORRONDONA" SET
  - △ CALCULATED POINT
  - IRON ROD FOUND (SIZE NOTED)
  - D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS
  - O.R.W.C.T. OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS

277.33 ACRES (BY DEED)  
 F. D. GAVRANOVIC  
 TO  
 F. D. GAVRANOVIC, JR.  
 VOLUME 255, PAGE 813  
 OCTOBER 29, 1997  
 O.R.W.C.T.

COUNTY ROAD No. 116  
 (a/k/a HENRY ROAD)

188.90 ACRES (BY DEED)  
 JOHN W. WILLIAMS AND  
 KIMBERLY J. WILLIAMS  
 TO  
 GREG A. KOENIG AND  
 RONALD C. KOENIG  
 VOLUME 733, PAGE 743  
 FEBRUARY 19, 2008  
 O.R.W.C.T.

**P.O.B.**  
 188.771 ACRES

CALCULATED POINT  
 TEXAS CENTRAL ZONE  
 NAD83/NSRS2007  
 STATE PLANE GRID COORDS.  
 GRID N: 9,696,358.66 US FT  
 GRID E: 3,663,395.21 US FT

**188.771 ACRES**

TRACT THREE  
 188.69 ACRES (BY DEED)  
 JOAN REID ANDERSON AND HUSBAND,  
 KEITH ANDERSON  
 TO  
 JEAN REID SEVERN  
 VOLUME 525, PAGE 612  
 NOVEMBER 1, 1979  
 D.R.W.C.T.

**SYLVANUS CASTLEMAN  
 SURVEY No. 5  
 ABSTRACT No. 12**

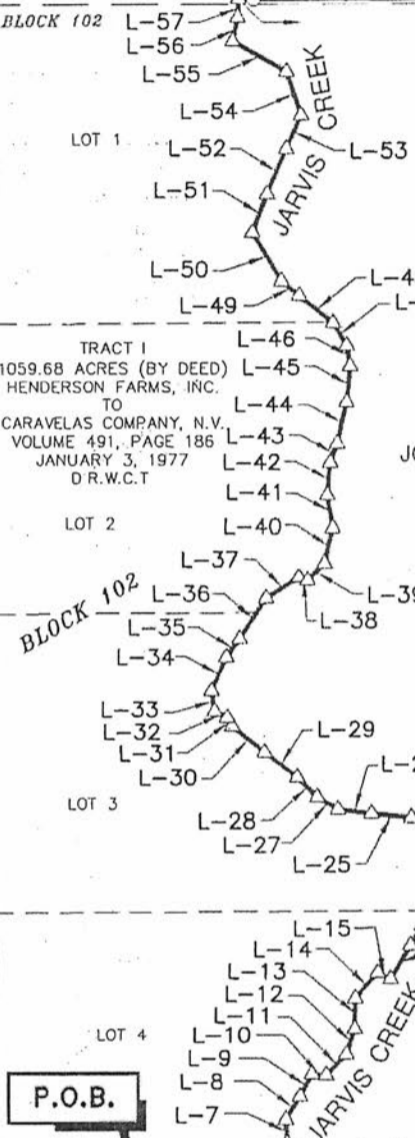
BLOCK 71  
 RE-SUBDIVISION  
 OF LANDS OF  
 MISSOURI-LINCOLN TRUST COMPANY  
 VOLUME 37, PAGE 640  
 D.R.W.C.T.

15' OUTFALL DRAINAGE  
 DITCH EASEMENT  
 COUNTY OF WHARTON  
 VOLUME 203, PAGE 109  
 D.R.W.C.T.

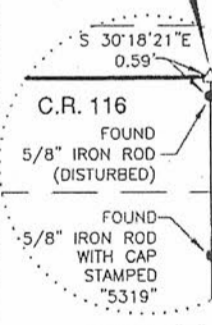
FOUND 1/2" IRON PIPE  
 WITH CAP  
 STAMPED "KALKOMEY"  
 1868.89'

562.205 ACRES (BY DEED)  
 MAXIM PRODUCTIONS CO., LP  
 TO  
 DCVK, LIMITED PARTNERSHIP  
 VOLUME 607, PAGE 247  
 MAY 9, 2005  
 O.R.W.C.T.

LINE	BEARING	DISTANCE
L-1	N 19°37'43"W	122.89'
L-2	N 57°13'23"W	86.10'
L-3	N 86°55'06"W	61.34'
L-4	N 29°00'14"W	94.99'
L-5	N 40°54'30"W	50.74'
L-6	N 74°08'20"W	72.88'
L-7	N 33°38'43"W	77.27'
L-8	N 01°24'32"E	86.52'
L-9	N 02°30'20"W	82.42'
L-10	N 63°51'24"E	46.39'
L-11	N 14°07'01"E	93.88'
L-12	N 13°01'03"W	87.59'
L-13	N 29°17'13"W	100.34'
L-14	N 09°46'18"E	111.53'
L-15	N 86°53'25"E	47.89'
L-16	N 00°08'02"W	128.00'
L-17	N 00°02'45"E	73.15'
L-18	N 16°28'27"W	109.57'
L-19	N 00°52'20"W	55.77'
L-20	N 53°06'12"W	85.79'
L-21	N 01°08'11"W	44.70'
L-22	N 51°48'51"W	29.81'
L-23	N 71°20'36"W	37.18'
L-24	S 84°57'55"W	44.22'
L-25	S 65°43'19"W	129.72'
L-26	S 67°05'20"W	108.75'
L-27	N 88°57'14"W	77.31'
L-28	N 75°27'32"W	92.30'
L-29	N 81°40'25"W	130.28'
L-30	N 80°36'22"W	135.33'
L-31	N 59°31'40"W	34.36'
L-32	S 87°01'53"W	46.12'
L-33	N 39°23'46"W	67.81'
L-34	N 06°59'08"W	120.00'
L-35	N 05°16'16"E	74.70'
L-36	N 03°56'55"E	153.86'
L-37	N 27°22'19"E	126.62'
L-38	N 82°20'02"E	29.00'
L-39	N 14°20'05"E	77.99'
L-40	N 16°30'02"W	116.16'
L-41	N 39°44'27"W	107.71'
L-42	N 25°03'07"W	106.82'
L-43	N 10°07'00"W	67.56'
L-44	N 17°24'47"W	138.99'
L-45	N 24°02'21"W	118.86'
L-46	N 39°37'15"W	69.33'
L-47	N 60°44'04"W	85.28'
L-48	N 80°34'22"W	141.05'
L-49	N 80°57'58"W	74.19'
L-50	N 60°18'44"W	183.95'
L-51	N 09°20'23"W	135.19'
L-52	N 07°06'59"W	160.38'
L-53	N 06°02'26"W	118.89'
L-54	N 48°32'13"W	149.25'
L-55	S 89°52'18"W	198.90'
L-56	N 18°38'44"W	79.27'
L-57	N 28°01'51"W	58.58'



**P.O.B.**



DETAIL "A"  
 (NOT TO SCALE)

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.

NOTE:  
 SEE PAGE 6 FOR EASEMENT NOTES.



Gorrondona & Associates, Inc.  
 4201 W. Parmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 719-9933

ACAD FILE: LCRAW114A-0007B.dwg  
 WORD FILE: LCRAW114A-0007B.doc  
 REVISION: N/A  
 SCALE: 1"=600'  
 DATE: 12/18/2012  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

188.771 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 5  
 ABSTRACT No. 12  
 WHARTON COUNTY, TEXAS



WHARTON COUNTY, TEXAS  
SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12

ONLY THESE EASEMENTS LISTED IN LIMITED TITLE CERTIFICATE GF No. 2012-1160 DATED DECEMBER 4, 2012, BY FIRST AMERICAN TITLE INSURANCE COMPANY WERE EVALUATED FOR THIS SURVEY.  
NO OTHER EASEMENT RECORD RESEARCH WAS PERFORMED BY GORRONDONA & ASSOCIATES INC.

- c. Easement for outfall ditch across Block 71 as shown in instrument from J.J. Pendergrass, et ux to Wharton County, dated January 12, 1948 and filed in Volume 203, Page 109, Deed Records of Wharton County, Texas. (Does affect subject tract and is shown hereon)

*[Handwritten Signature]*  
12/18/2012

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.



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 Austin, Texas 78727  
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ACAD FILE: LCRAW114A-0007B.dwg  
 WORD FILE: LCRAW114A-0007B.doc  
 REVISION: N/A  
 SCALE: 1"=600'  
 DATE: 12/18/2012  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

188.771 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 5  
 ABSTRACT No. 12  
 WHARTON COUNTY, TEXAS

**LCRA**  
 ENERGY • WATER • COMMUNITY SERVICES  
 3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
 (512)473-3200 www.lcra.org

MID-COAST TITLE CO., INC.  
 111 N. Fulton  
 Wharton, TX 77488

STATE OF TEXAS COUNTY OF WHARTON  
 I, hereby certify that this document was filed on the date  
 and time stamped and was recorded  
 on 06/05/2013 3:00 PM

*[Handwritten Signature]*

SCANNED

COUNTY CLERK Wharton County, Texas  
 By: *[Handwritten Signature]* Deputy



Doc ID: 003109640014 Type: OFF  
Kind: WAIVER  
Recorded: 06/05/2013 at 03:07:41 PM  
Fee Amt: \$68.00 Page 1 of 14  
Wharton, TX  
Sandra K. Sanders County Clerk  
File# 2013-00003251  
BK **923** PG **928-941**

2012-1160

Space Above This Line Reserved For Recording Data

**NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OF THE FOLLOWING INFORMATION FROM THIS INSTRUMENT BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.**

**WAIVER OF SURFACE RIGHTS AND  
DESIGNATION OF DRILLSITES**

**Date:** Effective as of June 4, 2013

**Grantor:** JEAN REID SEVERN

**Grantor's Mailing Address:**

601 Buckeye Trail  
West Lake Hills, Texas 78746

**Grantee:** LOWER COLORADO RIVER AUTHORITY

**Grantee's Mailing Address:**

P. O. Box 220  
Austin, Texas 78767

**Consideration:** TEN (\$10.00) DOLLARS cash and other valuable consideration paid by Grantee to GRANTOR, the receipt of which is hereby acknowledged and confessed, GRANTOR.

**Property (including any improvements):** Being a 188.771 Acre Tract of Land Situated in Sylvanus Castleman Survey No.5, Abstract No. 12, in Wharton County, Texas, said 188.771 acre tract of land being a portion of Block 71, Re-subdivision of lands of Missouri-Lincoln Trust Company, as Recorded in Volume 37, Page 640 of the Deed Records of Wharton County, Texas (D.R.W.C.T.), said 188.771 acre tract of land being all of tract three, a 188.69 acre tract of land (By Deed), described in Deed from Joan Reid Anderson and husband, Keith Anderson to Jean Reid Severn, executed November 1, 1979, Recorded in Volume 525, Page 612, D.R.W.C.T., said 188.771 acre tract of land being more particularly described on **EXHIBIT "A"** attached hereto and made a part hereof for all purposes.

**Drillsites:** Being two (2) 5 acre tracts of land located in the Sylvanus Castleman League No. 4, Abstract No. 11, and the D.D.D. Baker Survey, Abstract No. 71 in Wharton County, Texas, and being more particularly described on **EXHIBIT "B"** attached hereto and made a part hereof for all purposes.

**Waiver of Surface Usage and Designation of Drillsite Locations:**



In order to provide for the development of the surface of the Property, and for the consideration above specified Grantor further grants to Grantee, except as hereafter provided, all Grantor's rights to use and/or come upon the surface of the Property described in attached Exhibit "A" to drill for or produce and otherwise utilize the minerals reserved by Grantor, and Grantor waives all of its rights (except as hereinafter specified) to use the surface of the Property, for all purposes, including, but not limited to, the exploration for and/or development of the minerals reserved by Grantors through any method then or thereafter known or used; provided, however, that Grantor shall have the right and retains for itself and its successors-in-interest, all rights to explore for, to drill and produce oil, gas and other minerals underlying or situated 500 feet or more below the surface of the Property by those means that do not use the surface of the Property or interfere with the use of the surface of the Property, including wells directionally drilled from surface locations on nearby lands (including the designated Drillsites) and by pooling or unitizing all or part of the Property with nearby lands where oil and gas operations may be conducted. The Grantor specifically reserves the right to perform across the entire tract described in the attached Exhibit "A" seismograph or vibrosize studies to explore for oil, gas and minerals, but only to the extent that such studies do not interfere with Grantee's use of the Property for its own purposes.

For and in consideration of the waiver of rights to use the surface of the Property provided in the preceding paragraph, Grantee hereby covenants and agrees with Grantor as follows:

a. Designation of Drillsite. Notwithstanding the matter set forth above, Grantor, for itself, shall have the non-exclusive right (together with Grantee and other mineral owners, if any) to use the surface of the Drillsites, for the exploration of, development of, drilling and initial and ongoing production of oil, gas and other similar hydrocarbon minerals in and under the Property. Grantor's right to develop and produce such oil, gas and other similar minerals from the surface of the Drillsite shall be limited solely to development, drilling and production through the bores of wells drilled on the Drillsite, and in no event shall Grantor, or its, successors, legal representatives or assigns, ever have the right to develop and produce said oil, gas and other similar hydrocarbons from the surface of the Property in any other manner provided, however, that the surface of the Drillsites may be used in combination with the surface of adjacent property owned by Grantor for joint production from the Drillsite or from wellsites located on such adjacent property. Upon commencement of operations upon the Drillsite, Grantee may require the mineral Lessee or operator to fence the Drillsite (as hereinafter defined) to separate the same from the other property of Grantee using four strands of barbed wire except for those fences which are also outside boundary fences for the entire tract. For such boundary fences, the materials shall be the same as the boundary fence. The mineral Lessee shall install a gate for each drillsite used. Following the completion of drilling and assuming Grantor's intention to undertake production efforts, all activities associated with initial and ongoing production will be permitted on, but limited to production improvements located on the Drillsite, including, but not limited to above ground improvements necessary and typical in the industry for production of oil, gas and other similar hydrocarbons (including meter and dehydration structures necessary for gathering line transportation purposes), subject to the aforesaid provision that the surface of the Drillsite may be used in combination with the surfaces of adjacent property for joint production from wellsites located on such adjacent property. Ingress and egress easements are also reserved to permit ingress and egress for vehicular and pedestrian use to the drillsites. Notwithstanding anything herein to the contrary, Grantor's right to explore for, develop, drill, and produce oil, gas, and similar hydrocarbons under lying or situated beneath the Property is limited to oil, gas, and hydrocarbons lying 500 feet or more below the surface of the earth.

b. Access Rights to the Drillsite. In addition to the rights afforded Grantor in Paragraph a. above, Grantee agrees to provide adequate vehicular access to and from the Drillsites as well as access for the purpose of laying of buried gas and salt water gathering lines to and from wells drilled from the surface of the Drillsites.

c. Directional Drilling. Grantor and Grantee confirm that Grantor shall have the right to explore for and develop the minerals retained by Grantor through directional drilling from the Drillsite or from surface locations in the vicinity of the Property, but not on the surface of the Property. Grantor shall not authorize any activity which will impair the subsurface support of the property outside the drillsites.

d. Non-Combination. Grantor for itself and its successors, legal representatives, and assigns, including any lessees of the mineral estate reserved by Grantor to their successors and assigns, covenant and agree not to use the surface of the Property through any rights obtained from the undivided mineral interests in the Property owned by persons other than the Grantor, which covenant is a covenant running with the land and with any mineral interest reserved by Grantor and is binding upon the owner of any part of the mineral interest reserved by Grantor and any lessee thereof.

e. Covenants. The covenants contained herein are for the benefit of the Property and the mineral interests in and under the Property reserved by Grantor herein and shall be covenants running with the Property and shall be binding upon and shall inure to the benefit of Grantor and Grantee, and their respective successors, legal representatives, heirs and assigns.

f. Hunting and Fishing. Grantor shall not have the right to use the Drillsites or the Property for hunting or fishing purposes or to grant such permission to anyone.

g. Assignment of Claim. In the event that Grantor's mineral Lessee shall discharge saltwater or substances classified by a governmental agency as harmful to the land on Grantee's property, or otherwise damage Grantee's or assigns property and roads purchased from Grantor, then Grantor, in exchange for a complete release of liability executed by Grantee or Grantee's assigns to Grantor, the Grantor will assign its claims for breach of contract and damages to Grantee or Grantee's assigns.

h. Electrical Power. Grantee agrees that no electric power line poles may be placed upon the surface of the Drillsites. *J.R.S.*

This agreement may be executed in multiple counterparts, each of which shall be binding upon the signing part or parties thereto as fully as if all parties had executed one instrument, and all such counterparts shall constitute one and the same instrument. The signature pages of the parties as affixed to the counterparts may be combined, treated and given effect for all purposes, including recordation, into one single instrument.

The Grantee hereby accepts this Waiver of Surface Rights and Designation of Drillsites subject to the conditions, reservations and exceptions contained herein.

When the context requires singular nouns and pronouns include the plural.

**GRANTOR:**

  
JEAN REID SEVERN

GRANTEE:

LOWER COLORADO RIVER AUTHORITY

By: Freid E. Crawford  
FREDRICK E. CRAWFORD, Manager Real Estate Services

THE STATE OF TEXAS §

COUNTY OF WHARTON §

On this 4 day of June, 2013, before me personally appeared JEAN REID SEVERN, to me known to be the person described in and who executed the foregoing instrument, and acknowledged that she executed the same as her free act and deed.

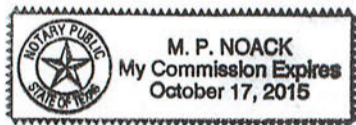


Christine D. Evanicky  
NOTARY PUBLIC, STATE OF TEXAS

THE STATE OF TEXAS §

COUNTY OF TRAVIS §

On this 29<sup>th</sup> day of ~~June~~<sup>May</sup>, 2013, before me personally FREDRICK E. CRAWFORD, Manager of Real Estate Services of the LOWER COLORADO RIVER AUTHORITY, to me known to be the person described in and who executed the foregoing instrument, and acknowledged that he executed the same as his free act and deed, in the capacity therein stated.



M P Noack  
NOTARY PUBLIC, STATE OF TEXAS

PREPARED IN THE OFFICE OF AND  
AFTER RECORDING RETURN TO:

Duckett, Bouligny & Collins, LLP  
207 W. Jackson  
P.O. Box 1567  
El Campo, TX 77437  
Tel: (979) 543-6845  
Fax: (979) 543-9516



EXHIBIT "A"

**BEING A 188.771 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12, IN WHARTON COUNTY, TEXAS, SAID 188.771 ACRE TRACT OF LAND BEING A PORTION OF BLOCK 71, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 188.771 ACRE TRACT OF LAND BEING ALL OF TRACT THREE, A 188.69 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM JOAN REID ANDERSON AND HUSBAND, KEITH ANDERSON TO JEAN REID SEVERN, EXECUTED NOVEMBER 1, 1979, RECORDED IN VOLUME 525, PAGE 612, D.R.W.C.T., SAID 188.771 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:**

**BEGINNING** at a calculated point (Grid Coordinates N=9,696,358.66 US Feet, E=3,663,395.21 US Feet) for the north corner of said Tract Three and for the west corner of a 188.90 acre tract of land (by deed), described in deed from John W. Williams and Kimberly J. Williams to Greg A. Koenig and Ronald C. Koenig, executed February 19, 2008, recorded in Volume 733, Page 743 of the Official Records of Wharton County, Texas, (O.R.W.C.T.), said point being in the northwest line of said Block 71 and in the southeast line of Block 70 of said Re-Subdivision of lands of Missouri-Lincoln Trust Company, said point also being in the approximate centerline of a 44 foot wide road dedication as shown on said Re-Subdivision of lands of Missouri-Lincoln Trust Company plat, currently known as County Road No. 116 (a/k/a Henry Road);

**THENCE** South 30 degrees 18 minutes 21 seconds East, with the northeast line of said Tract Three and with the southwest line of said 188.90 acre tract of land, passing at a distance of 0.59 feet, a 5/8 inch iron rod (disturbed) found for reference, passing at a distance of 30.57 feet, a 5/8 inch iron rod with cap stamped "5319" found for reference, passing at a distance of 1563.69 feet, a 5/8 inch iron rod with cap stamped "5319" found for reference, passing at a distance of 3300.59 feet, a 5/8 inch iron rod with cap stamped "5319" found for reference, in all, a distance of 4151.32 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the east corner of said Tract Three and for the south corner of said 188.90 acre tract of land, said 5/8 inch iron rod with cap stamped "GORRONDONA" being in the northwest line of a 562.205 acre tract of land (by deed), described in deed from Maxim Productions Co., LP to DCVK Limited Partnership, executed May 9, 2005, recorded in Volume 607, Page 247, O.R.W.C.T., said 5/8 inch iron rod with cap stamped "GORRONDONA" also being in the southeast line of said Block 71 and in the northwest line of Block 104, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company;

**THENCE** South 59 degrees 42 minutes 23 seconds West, with the southeast line of said Tract Three, with the southeast line of said Block 71, with the northwest line of said 562.205 acre tract of land, and with the northwest line of said Block 104, passing at a distance of 1868.89 feet, a 1/2 inch iron pipe with cap stamped "KALKOMEY" found for reference, in all, a distance of 1944.02 feet to a calculated point in the approximate centerline of Jarvis Creek, said point being in the southwest line of said Block 104, in the southeast line of Block 102, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, and also being in an interior line of Tract 1, a 1059.68 acre tract of land (by deed), described in deed from Henderson Farms, Inc., to Caravelas Company, N.V., executed January 3, 1977, recorded in Volume 491, Page 186, D.R.W.C.T.;

**THENCE**, with an interior line of said Tract Three, with an interior line of said Tract 1, and with the approximate centerline of Jarvis Creek, the following fifty-seven (57) courses:

1. North 19 degrees 37 minutes 43 seconds West, a distance of 122.89 feet to a point for corner;
2. North 57 degrees 13 minutes 23 seconds West, a distance of 88.10 feet to a point for corner;
3. North 86 degrees 55 minutes 06 seconds West, a distance of 61.34 feet to a point for corner;
4. North 29 degrees 00 minutes 14 seconds West, a distance of 94.99 feet to a point for corner;
5. North 40 degrees 54 minutes 30 seconds West, a distance of 50.74 feet to a point for corner;
6. North 74 degrees 08 minutes 20 seconds West, a distance of 72.88 feet to a point for corner;
7. North 33 degrees 38 minutes 43 seconds West, a distance of 77.27 feet to a point for corner;



8. North 01 degree 24 minutes 32 seconds East, a distance of 86.52 feet to a point for corner;
9. North 02 degrees 30 minutes 20 seconds West, a distance of 82.42 feet to a point for corner;
10. North 63 degrees 51 minutes 24 seconds East, a distance of 46.39 feet to a point for corner;
11. North 14 degrees 07 minutes 01 second East, a distance of 93.88 feet to a point for corner;
12. North 13 degrees 01 minute 03 seconds West, a distance of 87.59 feet to a point for corner;
13. North 29 degrees 17 minutes 13 seconds West, a distance of 100.34 feet to a point for corner;
14. North 09 degrees 46 minutes 18 seconds East, a distance of 111.53 feet to a point for corner;
15. North 86 degrees 53 minutes 25 seconds East, a distance of 47.89 feet to a point for corner;
16. North 00 degrees 08 minutes 02 seconds West, a distance of 128.00 feet to a point for corner;
17. North 00 degrees 02 minutes 45 seconds East, a distance of 73.15 feet to a point for corner;
18. North 16 degrees 28 minutes 27 seconds West, a distance of 109.57 feet to a point for corner;
19. North 00 degrees 52 minutes 20 seconds West, a distance of 55.77 feet to a point for corner;
20. North 53 degrees 06 minutes 12 seconds West, a distance of 85.79 feet to a point for corner;
21. North 01 degree 08 minutes 11 seconds West, a distance of 44.70 feet to a point for corner;
22. North 51 degrees 48 minutes 51 seconds West, a distance of 29.81 feet to a point for corner;
23. North 71 degrees 20 minutes 36 seconds West, a distance of 37.18 feet to a point for corner;
24. South 84 degrees 57 minutes 55 seconds West, a distance of 44.22 feet to a point for corner;
25. South 65 degrees 43 minutes 19 seconds West, a distance of 129.72 feet to a point for corner;
26. South 67 degrees 05 minutes 20 seconds West, a distance of 108.75 feet to a point for corner;
27. North 88 degrees 57 minutes 14 seconds West, a distance of 77.31 feet to a point for corner;
28. North 75 degrees 27 minutes 32 seconds West, a distance of 92.30 feet to a point for corner;
29. North 81 degrees 40 minutes 25 seconds West, a distance of 130.28 feet to a point for corner;
30. North 80 degrees 36 minutes 22 seconds West, a distance of 135.33 feet to a point for corner;
31. North 59 degrees 31 minutes 40 seconds West, a distance of 34.36 feet to a point for corner;
32. South 87 degrees 01 minute 53 seconds West, a distance of 46.12 feet to a point for corner;

33. North 39 degrees 23 minutes 46 seconds West, a distance of 67.81 feet to a point for corner;
34. North 06 degrees 59 minutes 08 seconds West, a distance of 120.00 feet to a point for corner;
35. North 05 degrees 16 minutes 16 seconds East, a distance of 74.70 feet to a point for corner;
36. North 03 degrees 56 minutes 55 seconds East, a distance of 153.86 feet to a point for corner;
37. North 27 degrees 22 minutes 19 seconds East, a distance of 126.62 feet to a point for corner;
38. North 82 degrees 20 minutes 02 seconds East, a distance of 29.00 feet to a point for corner;
39. North 14 degrees 20 minutes 05 seconds East, a distance of 77.99 feet to a point for corner;
40. North 16 degrees 30 minutes 02 seconds West, a distance of 116.16 feet to a point for corner;
41. North 39 degrees 44 minutes 27 seconds West, a distance of 107.71 feet to a point for corner;
42. North 25 degrees 03 minutes 07 seconds West, a distance of 106.82 feet to a point for corner;
43. North 10 degrees 07 minutes 00 seconds West, a distance of 67.56 feet to a point for corner;
44. North 17 degrees 24 minutes 47 seconds West, a distance of 138.99 feet to a point for corner;
45. North 24 degrees 02 minutes 21 seconds West, a distance of 118.86 feet to a point for corner;
46. North 39 degrees 37 minutes 15 seconds West, a distance of 69.33 feet to a point for corner;
47. North 60 degrees 44 minutes 04 seconds West, a distance of 85.28 feet to a point for corner;
48. North 80 degrees 34 minutes 22 seconds West, a distance of 141.05 feet to a point for corner;
49. North 80 degrees 57 minutes 58 seconds West, a distance of 74.19 feet to a point for corner;
50. North 60 degrees 18 minutes 44 seconds West, a distance of 183.95 feet to a point for corner;
51. North 09 degrees 20 minutes 23 seconds West, a distance of 135.19 feet to a point for corner;
52. North 07 degrees 06 minutes 59 seconds West, a distance of 160.38 feet to a point for corner;
53. North 06 degrees 02 minutes 26 seconds West, a distance of 118.89 feet to a point for corner;
54. North 48 degrees 32 minutes 13 seconds West, a distance of 149.25 feet to a point for corner;
55. South 89 degrees 52 minutes 18 seconds West, a distance of 198.90 feet to a point for corner;
56. North 18 degrees 38 minutes 44 seconds West, a distance of 79.27 feet to a point for corner;

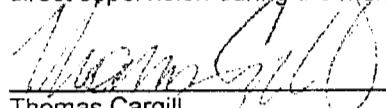
57. North 28 degrees 01 minute 51 seconds West, a distance of 58.58 feet to a calculated point for the west corner of said Tract Three and for an interior ell corner of said Tract I, said calculated point being the west corner of said Block 71 and the north corner of said Block 102, said calculated point also being in the southeast line of said Block 70;

**THENCE** North 59 degrees 50 minutes 29 seconds East, with the north line of said Tract Three, with an interior line of said Tract I, with the north line of said Block 71, and with the south line of said Block 70, passing at a distance of 50.00 feet, a 5/8 inch iron rod with cap stamped "GORRONDONA" set for reference, passing at a distance of 1964.13 feet, a 5/8 inch iron rod found for an exterior ell corner of said Tract I and for the south corner of a 277.33 acre tract of land (by deed), described in deed from F. D. Gavranovic to F. D. Gavranovic, Jr., executed October 29, 1977, recorded in Volume 255, Page 813, O.R.W.C.T., continuing in all, a distance of 2209.82 feet to the **POINT OF BEGINNING**, and containing 188.771 acres of land, more or less.

Bearing Basis: Texas Lambert Grid, Central Zone, NAD83/NSRS2007.

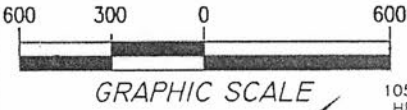
All distances are surface values and in U. S. Survey Feet. To compute grid values multiply surface distances by a Combined Scale Factor of 1.00037640.

The field notes and the plat attached hereto represent an on-the-ground survey made under my direct supervision during the months of September 2012 to November 2012.

  
\_\_\_\_\_  
Thomas Cargill  
Registered Professional Land Surveyor No. 5835  
Gorrondona and Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933

Word File: LCRAW114A-0007B.DOC  
Drawing File: LCRAW114A-0007B.DWG

WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12



TRACT I  
 1059.68 ACRES (BY DEED)  
 HENDERSON FARMS, INC.  
 TO  
 CARAVELAS COMPANY, N.V.  
 VOLUME 491, PAGE 186  
 JANUARY 3, 1977  
 D.R.W.C.T.  
 44' ROAD DEDICATION  
 RE-SUBDIVISION MISSOURI-LINCOLN  
 TRUST COMPANY  
 VOLUME 37, PAGE 640  
 D.R.W.C.T.

- 12/18/2012
- LEGEND**
- ⊙ IRON PIPE FOUND (SIZE NOTED)
  - 5/8" IRON ROD WITH CAP
  - △ CALCULATED POINT
  - IRON ROD FOUND (SIZE NOTED)
  - D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS
  - O.R.W.C.T. OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS

277.33 ACRES (BY DEED)  
 F. D. GAVRANOVIC  
 TO  
 F. D. GAVRANOVIC, JR.  
 VOLUME 255, PAGE 813  
 OCTOBER 29, 1997  
 O.R.W.C.T.

COUNTY ROAD No. 116  
 (a/k/a HENRY ROAD)

188.90 ACRES (BY DEED)  
 JOHN W. WILLIAMS AND  
 KIMBERLY J. WILLIAMS  
 TO  
 GREG A. KOENIG AND  
 RONALD C. KOENIG  
 VOLUME 733, PAGE 743  
 FEBRUARY 19, 2008  
 O.R.W.C.T.

**P.O.B.**  
 188.771 ACRES

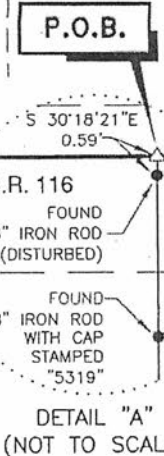
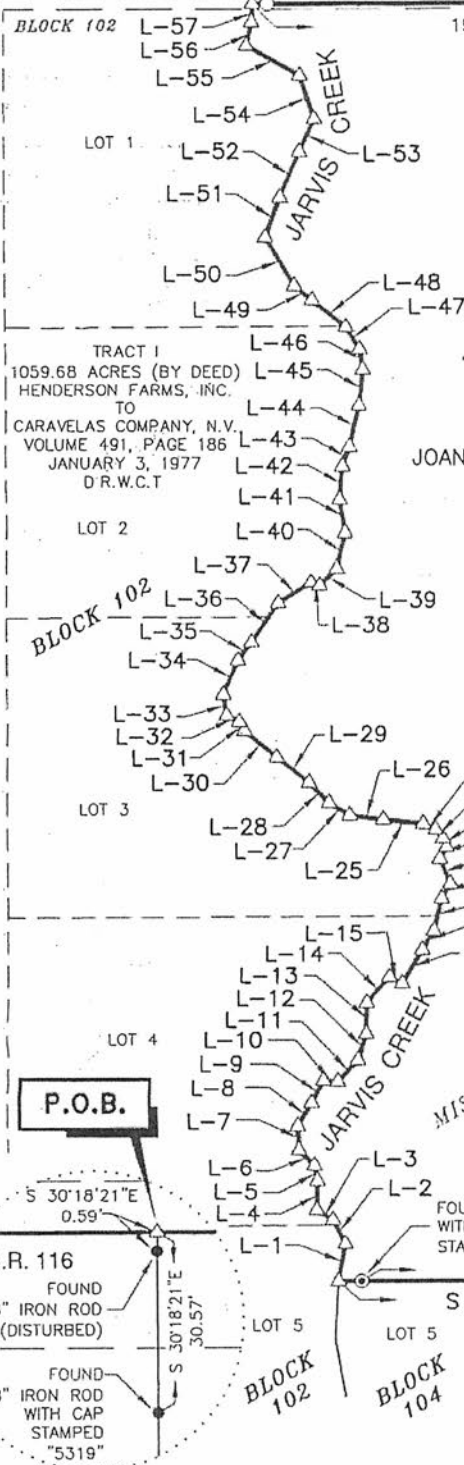
CALCULATED POINT  
 TEXAS CENTRAL ZONE  
 NAD83/NSRS2007  
 STATE PLANE GRID COORDS.  
 GRID N: 9,696,358.66 US FT  
 GRID E: 3,663,395.21 US FT

**188.771 ACRES**

TRACT THREE  
 188.69 ACRES (BY DEED)  
 JOAN REID ANDERSON AND HUSBAND,  
 KEITH ANDERSON  
 TO  
 JEAN REID SEVERN  
 VOLUME 525, PAGE 612  
 NOVEMBER 1, 1979  
 D.R.W.C.T.

**SYLVANUS CASTLEMAN  
 SURVEY No. 5  
 ABSTRACT No. 12**

LINE	BEARING	DISTANCE
L-1	N 19°37'43"W	122.89'
L-2	N 57°13'23"W	88.10'
L-3	N 86°55'06"W	61.34'
L-4	N 29°00'14"W	94.99'
L-5	N 40°54'30"W	50.74'
L-6	N 74°08'20"W	72.88'
L-7	N 33°38'43"W	77.27'
L-8	N 01°24'32"E	86.52'
L-9	N 02°30'20"W	82.42'
L-10	N 63°51'24"E	46.39'
L-11	N 14°07'01"E	93.88'
L-12	N 13°01'03"W	87.59'
L-13	N 29°17'13"W	100.34'
L-14	N 09°46'18"E	111.53'
L-15	N 86°53'25"E	47.89'
L-16	N 00°08'02"W	128.00'
L-17	N 00°02'45"E	73.15'
L-18	N 16°28'27"W	109.57'
L-19	N 00°52'20"W	55.77'
L-20	N 53°06'12"W	85.79'
L-21	N 01°08'11"W	44.70'
L-22	N 51°48'51"W	29.81'
L-23	N 71°20'36"W	37.18'
L-24	S 84°57'55"W	44.22'
L-25	S 65°43'19"W	129.72'
L-26	S 67°05'20"W	108.75'
L-27	N 88°57'14"W	77.31'
L-28	N 75°27'32"W	92.30'
L-29	N 81°40'25"W	130.28'
L-30	N 80°36'22"W	135.33'
L-31	N 59°31'40"W	34.36'
L-32	S 87°01'53"W	46.12'
L-33	N 39°23'46"W	67.81'
L-34	N 06°59'08"W	120.00'
L-35	N 05°16'16"E	74.70'
L-36	N 03°56'55"E	153.86'
L-37	N 27°22'19"E	126.62'
L-38	N 82°20'02"E	29.00'
L-39	N 14°20'05"E	77.99'
L-40	N 16°30'02"W	116.16'
L-41	N 39°44'27"W	107.71'
L-42	N 25°03'07"W	106.82'
L-43	N 10°07'00"W	67.56'
L-44	N 17°24'47"W	138.99'
L-45	N 24°02'21"W	118.66'
L-46	N 39°37'15"W	69.33'
L-47	N 60°44'04"W	85.28'
L-48	N 80°34'22"W	141.05'
L-49	N 80°57'58"W	74.19'
L-50	N 60°18'44"W	183.95'
L-51	N 09°20'23"W	135.19'
L-52	N 07°06'59"W	160.38'
L-53	N 06°02'26"W	118.89'
L-54	N 48°32'13"W	149.25'
L-55	S 89°52'18"W	198.90'
L-56	N 18°38'44"W	79.27'
L-57	N 28°01'51"W	58.58'



HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.

NOTE: SEE PAGE 6 FOR EASEMENT NOTES.



Gorrondona & Associates, Inc.  
 4201 W. Parmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 719-9933

ACAD FILE: LCRAW114A-0007B.dwg  
 WORD FILE: LCRAW114A-0007B.doc  
 REVISION: N/A  
 SCALE: 1"=600'  
 DATE: 12/18/2012  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

188.771 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 5  
 ABSTRACT No. 12  
 WHARTON COUNTY, TEXAS



WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12

COUNTY CLERK'S MEMO  
 Portions of this document  
 were not legible or reproducible  
 for recording

Sandra K. Sanders  
 County Clerk Wharton County  
 P.O. Box 69  
 Wharton, Texas 77488

ONLY THESE EASEMENTS LISTED IN LIMITED TITLE CERTIFICATE GF No. 2012-1160 DATED DECEMBER 4, 2012, BY FIRST AMERICAN TITLE INSURANCE COMPANY WERE EVALUATED FOR THIS SURVEY.  
 NO OTHER EASEMENT RECORD RESEARCH WAS PERFORMED BY GORRONDONA & ASSOCIATES INC.

- c. Easement for outfall ditch across Block 71 as shown in instrument from J.J. Pendergrass, et ux to Wharton County, dated January 12, 1948 and filed in Volume 203, Page 109, Deed Records of Wharton County, Texas. (Does affect subject tract and is shown hereon)

*[Handwritten Signature]*  
 12/18/2012

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.



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 4201 W. Parmer Lane, Bldg. B, Suite 100  
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ACAD FILE: LCRAW114A-0007B.dwg  
 WORD FILE: LCRAW114A-0007B.doc  
 REVISION: N/A  
 SCALE: 1"=600'  
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 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

188.771 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 5  
 ABSTRACT No. 12  
 WHARTON COUNTY, TEXAS

**LCRA**  
 ENERGY • WATER • COMMUNITY SERVICES  
 3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
 (512) 473-3200 www.lcra.org

EXHIBIT "B"

TRACT 1

**BEING A 5.000 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12 IN WHARTON COUNTY, TEXAS, SAID 5.000 ACRE TRACT OF LAND BEING A PORTION OF LOT 1, BLOCK 102, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 5.000 ACRE TRACT OF LAND ALSO BEING A PORTION OF TRACT I, A 1059.68 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM HENDERSON FARMS, INC. TO CARAVELAS COMPANY, N.V., EXECUTED JANUARY 3, 1977, RECORDED IN VOLUME 491, PAGE 186, D.R.W.C.T., SAID 5.000 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:**

**COMMENCING** at a 5/8 inch iron rod found for an exterior ell corner of said Tract I and for the south corner of a 277.33 acre tract of land (by deed), described in deed from F. D. Gavranovic to F. D. Gavranovic, Jr., executed October 29, 1997, recorded in Volume 255, Page 813 of the Official Records of Wharton County, Texas, (O.R.W.C.T.), said 5/8 inch iron rod being in the south line of Block 70 and being in the north line of Block 71, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, said 5/8 inch iron rod being in the north line of Tract Three, a 188.69 acre tract of land (by deed), described in deed from Joan Reid Anderson and husband, Keith Anderson to Jean Reid Severn, executed November 1, 1979, recorded in Volume 525, Page 612, D.R.W.C.T. and also being in the approximate centerline of County Road No. 116 (a/k/a Henry Road); **THENCE** South 59 degrees 50 minutes 29 seconds West, with an interior line of said Tract I, with the north line of said Tract Three, with the south line of said Block 70, with the north line of said Block 71, and with the approximate centerline of said County Road No. 116 passing at a distance of 1914.13 feet, a 5/8 inch iron rod with cap stamped "GORRONDONA" found for reference, in all, a distance of 1964.13 feet to a calculated point in the approximate centerline of Jarvis Creek, for an interior ell corner of said Tract I and for the west corner of said Tract Three; **THENCE** South 39 degrees 26 minutes 31 seconds West (radial bearing), a distance of 358.32 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the **POINT OF BEGINNING** (Grid Coordinates N=9,694,971.10 US Feet, E=3,661,256.17 US Feet);

**THENCE** South 30 degrees 14 minutes 06 seconds East, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

**THENCE** South 59 degrees 45 minutes 54 seconds West, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

**THENCE** North 30 degrees 14 minutes 06 seconds West, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

**THENCE** North 59 degrees 45 minutes 54 seconds East, a distance of 466.69 feet to the **POINT OF BEGINNING** and containing 5.000 acres of land, more or less.

**TRACT 2**

**BEING A 5.000 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12 IN WHARTON COUNTY, TEXAS, SAID 5.000 ACRE TRACT OF LAND BEING A PORTION OF LOT 4, BLOCK 102, AND LOT 5, BLOCK 102, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 5.000 ACRE TRACT OF LAND ALSO BEING A PORTION OF TRACT I, A 1059.68 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM HENDERSON FARMS, INC. TO CARAVELAS COMPANY, N.V., EXECUTED JANUARY 3, 1977, RECORDED IN VOLUME 491, PAGE 186, D.R.W.C.T., SAID 5.000 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:**

**COMMENCING** at a 5/8 inch iron rod found for an exterior ell corner of said Tract I and for the south corner of a 277.33 acre tract of land (by deed), described in deed from F. D. Gavranovic to F. D. Gavranovic, Jr., executed October 29, 1997, recorded in Volume 255, Page 813 of the Official Records of Wharton County, Texas, (O.R.W.C.T.), said 5/8 inch iron rod being in the south line of Block 70 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company and in the north line of Block 71 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, said 5/8 inch iron rod being in the north line of Tract Three, a 188.69 acre tract of land (by deed), described in deed from Joan Reid Anderson and husband, Keith Anderson to Jean Reid Severn, executed November 1, 1979, recorded in Volume 525, Page 612, D.R.W.C.T., and also being in the approximate centerline of County Road No. 116 (a/k/a Henry Road), from which a 5/8 inch iron rod with cap stamped "GORRONDONA" found for reference in an interior line of said Tract I and in the north line of said Tract Three, bears, South 59 degrees 50 minutes 29 seconds West, a distance of 1914.13 feet; THENCE North 59 degrees 50 minutes 29 seconds East, with the south line of said 277.33 acre tract of land, with the north line of said Tract Three, with the south line of said Block 70, with the north line of said Block 71, and with the approximate centerline of said County Road No. 116, a distance of 245.69 feet to a calculated point for the north corner of said Tract Three and for the west corner of a 188.90 acre tract of land (by deed), described in deed from John W. Williams and Kimberly J. Williams to Greg A. Koenig and Ronald C. Koenig, executed February 19, 2008, recorded in Volume 733, Page 743, O.R.W.C.T.; THENCE South 30 degrees 18 minutes 21 seconds East, with the northeast line of said Tract Three and with the southwest line of said 188.90 acre tract of land, passing at a distance of 0.59 feet, a 5/8 inch iron rod (disturbed) found for reference, passing at a distance of 30.57 feet, a 5/8 inch iron rod with cap stamped "5319" found for reference, in all, a distance of 4151.32 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" found for the east corner of said Tract Three and for the south corner of said 188.90 acre tract of land, said 5/8 inch iron rod with cap stamped "GORRONDONA" being in the north line of a 562.205 acre tract of land (by deed), described in deed from Maxim Productions Co., LP to DCVK Limited Partnership, executed May 9, 2005, recorded in Volume 607, Page 247, O.R.W.C.T., said 5/8 inch iron rod with cap stamped "GORRONDONA" being in the south line of said Block 71 and also being in the north line of Block 104, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company; THENCE South 59 degrees 42 minutes 23 seconds West, with the south line of said Tract Three, with the south line of said Block 71, with the north line of said 562.205 acre tract of land, and with the north line of said Block 104, passing at a distance of 1868.89 feet, a 1/2 inch iron pipe with cap stamped "KALKOMEY" found for reference, in all, a distance of 1944.02 feet to a calculated point in the approximate centerline of Jarvis Creek, said point being the southwest corner of said Block 71 and the northwest corner of said Block 104, said point being in the southeast line of Block 102, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company and also being in an interior line of said Tract I; THENCE South 65 degrees 19 minutes 22 seconds West (radial bearing), a distance of 457.71 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the **POINT OF BEGINNING** (Grid Coordinates N=9,691,601.02 US Feet, E=3,663,395.65 US Feet);

**THENCE** South 59 degrees 45 minutes 54 seconds West, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

**THENCE** North 30 degrees 14 minutes 06 seconds West, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

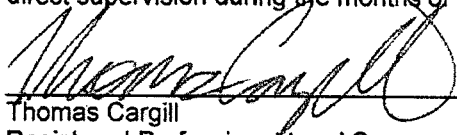
**THENCE** North 59 degrees 45 minutes 54 seconds East, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

**THENCE** South 30 degrees 14 minutes 06 seconds East, a distance of 466.69 feet to the **POINT OF BEGINNING**, and containing 5.000 acres of land, more or less.

Bearing Basis: Texas Lambert Grid, Central Zone, NAD83/NSRS2007.

All distances are surface values and in U. S. Survey Feet. To compute grid values multiply surface distances by a Combined Scale Factor of 1.00037640.

The field notes and the plat attached hereto represent an on-the-ground survey made under my direct supervision during the months of March 2013 to April 2013.



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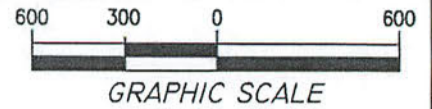
Thomas Cargill  
Registered Professional Land Surveyor No. 5835  
Gorronzona and Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933



Word File: LCRAW114A-00010A.DOC  
Drawing File: LCRAW114A-00010A.DWG

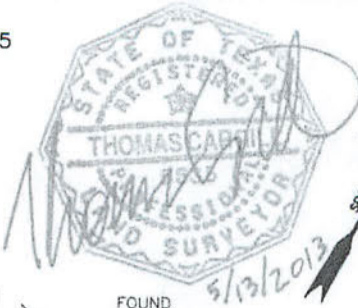


WHARTON COUNTY, TEXAS  
SYLVANUS CASTLEMAN SURVEY No. 5  
ABSTRACT No. 12



LOT 5 SET  
5/8" IRON ROD WITH CAP  
STAMPED "GORRONDONA"  
TEXAS CENTRAL ZONE  
NAD83/NSRS2007  
STATE PLANE GRID COORDS.  
GRID N: 9,694,971.10 US FT  
GRID E: 3,661,256.17 US FT

**P.O.B.  
TRACT 1  
5.000 ACRES**



**P.O.C.  
TRACT 1 &  
TRACT 2**

277.33 ACRES (BY DEED)  
F. D. GAVRANOVIC  
TO  
F. D. GAVRANOVIC, JR.  
VOLUME 255, PAGE 813  
OCTOBER 29, 1997  
O.R.W.C.T.

LOT 6

FOUND  
5/8" IRON ROD  
WITH CAP STAMPED "GORRONDONA"

BLOCK 101 BLOCK 70

S 59°50'29"W 1914.13' BLOCK 70

BLOCK 103

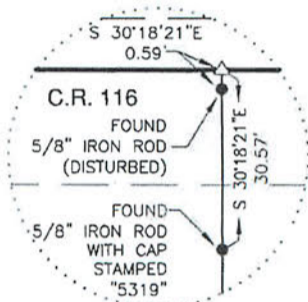
S 59°50'29"W 1964.13' BLOCK 71

TRACT 1  
5.000 ACRES

COUNTY ROAD No. 116  
(a/k/a HENRY ROAD)

LOT 1

44' ROAD DEDICATION  
RE-SUBDIVISION  
MISSOURI-LINCOLN  
TRUST COMPANY  
VOLUME 37, PAGE 640  
D.R.W.C.T.



SYLVANUS CASTLEMAN  
SURVEY No. 5  
ABSTRACT No. 12

APPROXIMATE CL  
OF JARVIS CREEK

TRACT THREE  
188.69 ACRES (BY DEED)  
JOAN REID ANDERSON  
AND HUSBAND, KEITH ANDERSON  
TO  
JEAN REID SEVERN  
VOLUME 525, PAGE 612  
NOVEMBER 1, 1979  
D.R.W.C.T.

DETAIL "A"  
(NOT TO SCALE)

LEGEND

- △ CALCULATED POINT
  - 5/8" IRON ROD WITH CAP STAMPED "GORRONDONA" SET
  - ⊙ IRON PIPE FOUND (SIZE NOTED)
  - IRON ROD FOUND (SIZE NOTED)
- D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS  
O.R.W.C.T. OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS

RE-SUBDIVISION OF LANDS  
OF MISSOURI-LINCOLN  
TRUST COMPANY  
VOLUME 37, PAGE 640  
D.R.W.C.T.

TRACT 1  
1059.68 ACRES (BY DEED)  
HENDERSON FARMS, INC.  
TO  
CARAVELAS COMPANY, N.V.  
VOLUME 491, PAGE 186  
JANUARY 3, 1977  
D.R.W.C.T.

LINE	BEARING	DISTANCE
L-1	S 39°26'31"W	358.32'
L-2	S 30°14'06"E	466.69'
L-3	S 59°45'54"W	466.69'
L-4	N 30°14'06"W	466.69'
L-5	N 59°45'54"E	466.69'
L-6	S 65°19'22"W	457.71'
L-7	S 59°45'54"W	466.69'
L-8	N 30°14'06"W	466.69'
L-9	N 59°45'54"E	466.69'
L-10	S 30°14'06"E	466.69'

188.90 ACRES (BY DEED)  
JOHN W. WILLIAMS AND KIMBERLY J. WILLIAMS  
TO  
GREG A. KOENIG AND RONALD C. KOENIG  
VOLUME 733, PAGE 743  
FEBRUARY 19, 2008  
O.R.W.C.T.

TRACT 2  
5.000 ACRES

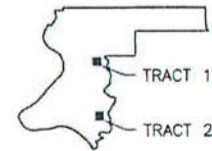
FOUND  
1/2" IRON PIPE  
WITH CAP  
STAMPED "KALKOMEY"

FOUND  
5/8" IRON ROD WITH CAP  
STAMPED "GORRONDONA"

1868.89'

S 59°42'23"W 1944.02'

562.205 ACRES (BY DEED)  
MAXIM PRODUCTIONS CO., LP  
TO  
DCVK, LIMITED PARTNERSHIP  
VOLUME 607, PAGE 247  
MAY 9, 2005  
O.R.W.C.T.



WHOLE PROPERTY MAP  
& LOCATION OF TRACTS  
Gorrondona & Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933

NOTE: SEE PAGE 5 FOR EASEMENT NOTES.  
HORIZONTAL DATUM: NAD83/NSRS2007  
VERTICAL DATUM: NAVD 88  
COMBINED SCALE FACTOR: 1.00037640  
BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.

ACAD FILE: LCRAW114A-00010A.dwg  
WORD FILE: LCRAW114A-00010A.doc  
REVISION: 0  
SCALE: 1"=600'  
DATE: 5/13/2013  
WO NO.: 72166  
FIELD BOOK: LCRA2  
DRAWN BY: R. Eckert

TWO TRACTS TOTALING 10.000 ACRES  
OUT OF  
SYLVANUS CASTLEMAN SURVEY No. 5  
ABSTRACT No. 12  
WHARTON COUNTY, TEXAS



MID-COAST TITLE CO., INC.  
111 N. Fulton  
Wharton, TX 77488

STATE OF TEXAS COUNTY OF WHARTON  
I, hereby certify that this document was filed on the date  
and time stamped and was recorded  
on 06/05/2013 3:07 PM

Andra K Sanders



COUNTY CLERK Wharton County, Texas  
By: Deputy

SCANNED

## **Worksheet 2**

### **Attachment 1:**

#### **Inundated Area Deeds**

**OCL-02**

Space Above This Line Reserved For Recording Data

**NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.**

2012-0904  
GF#3012-1100

### Special Warranty Deed

**Date:** June 26, 2013

**Grantor:** CARAVELAS COMPANY, a Delaware corporation, successor by domestication to CARAVELAS COMPANY, N.V., a Netherlands Antilles Company

**Grantor's Mailing Address:**

P.O. Box 217  
Urbana, Illinois 61803-0217  
Champaign County

**Grantee:** LOWER COLORADO RIVER AUTHORITY, a political subdivision of the State of Texas

**Grantee's Mailing Address:**

P.O. Box 220  
Austin, Texas 78767  
Travis County

**Consideration:**

Ten dollars (\$10.00) and other consideration paid pursuant to an agreement with Grantee, a political subdivision of the State of Texas, with power of Eminent Domain, as defined §1033 of the Internal Revenue Code.

**Property (including any improvements):**

**TRACT ONE:**

Being a 1063.187 acre tract of land situated in Sylvanus Castleman Survey No. 4, Abstract No. 11 and Sylvanus Castleman Survey No. 5, Abstract No. 12, both in Wharton County, Texas, Said 1063.187 Acre Tract of Land Being a Portion of Block 38, Block 39, Block 47, and Block 70, Re-subdivision of lands of Missouri-Lincoln Trust Company, as Recorded in Volume 37, Page 640 of the Deed Records of Wharton County, Texas (D.R.W.C.T.), said 1063.187 acre tract of land also being a portion of Lot 13, Lot 14, Lot 15, and Lot 16, Block 101 of said Re-subdivision of Lands of Missouri-Lincoln Trust Company, Said 1063.187 acre tract of land being all of Lot 1, Lot 2, Lot 3, Lot 4, Lot 5, Lot 6, Lot 7, Lot 8, Lot 9, Lot 10, Lot 11, Lot 12, Lot 17, Lot 18, and Lot 19, Block 101, of Said Re-subdivision of Lands of Missouri-Lincoln Trust Company, Said 1063.187 acre tract of land being all of Lot 1, Lot 2, Lot 3, Lot 4, and Lot 5, Block 102, of Said Re-subdivision of Lands of Missouri-Lincoln Trust Company, said 1063.187 acre tract of land being all of Lot 1, Lot 2, Lot 3, Lot 4, Lot 5, Lot 6, Lot 7, Lot 8, Lot 9, Lot 10, Lot 11, and Lot 12, Block 103, of Said Re-subdivision of Lands of Missouri-Lincoln Trust Company, said 1063.187 acre tract of land being a portion of Lot 13, Block 105, of Said Re-subdivision of Lands of Missouri-Lincoln Trust Company, said 1063.187 acre tract of land being all of Tract I, a 1059.68 acre Tract of land (By Deed), Described in Deed from Henderson Farms, Inc., to Caravelas Company, N.V., Executed January 3, 1977, Recorded in Volume 491, Page 186, D.R.W.C.T., said 1063.187 acre tract of land being more particularly described on EXHIBIT "A" attached hereto and made a part hereof for all purposes.

**TRACT TWO:**

Being a 379.090 acre tract of land situated in Sylvanus Castleman Survey No. 5, Abstract No. 12, John McCrosky Survey No 2, Abstract No. 630, and Gulf, Western Texas & Pacific Railway Company Survey No. 1, Abstract No. 625, All in Wharton County, Texas, said 379.090 Acre Tract of Land being a portion of Block 48 and Block 69, Re-subdivision of Lands of Missouri-Lincoln Trust Company, as Recorded in Volume 37, Page 640 of the Deed Records of Wharton County, Texas (D.R.W.C.T.), said 379.090 acre tract of land being all of Tract III, a 379.68 Acre tract of land (By Deed), Described in Deed from Henderson Farms, Inc. to Caravelas Company, N.V., Executed January 3, 1977, Recorded in Volume 491, Page 186, D.R.W.C.T., said 379.090 acre tract of land being more particularly described metes and bounds on EXHIBIT "B" attached hereto and made a part hereof for all purposes.

**TRACT THREE:**

Being a 189.492 acre tract of land situated in Sylvanus Castleman Survey No.4, Abstract No. 11, D. Davis & D. Baker Survey, Abstract No. 71, and John McCrosky Survey No. 2, Abstract No. 630, all in Wharton County, Texas, said 189.492 acre tract of land being a portion of Block 38 and Block 39, Re-subdivision of Lands of Missouri-Lincoln Trust Company, as Recorded in Volume 37, Page 640 of the Deed Records of Wharton County, Texas (D.R.W.C.T.), said 189.492 Acre Tract of Land being all of Tract II, a 189.51 acre tract of land (By Deed), described in Deed from Henderson Farms, Inc., to Caravelas Company, N.V., Executed January 3, 1977, Recorded in Volume 491, Page 186, D.R.W.C.T., Said 189.492 acre tract of land being more particularly described metes and bounds on EXHIBIT "C" attached hereto and made a part hereof for all purposes.

**Reservations from Conveyance:** SAVE AND EXCEPT, that out of the grant hereby made, there is excepted and reserved unto the Grantor herein, Grantor's heirs and assigns, all of the oil, gas and other minerals of every kind and character, in, on and under and that may be produced from the lands and premises hereinabove described.

**Exceptions to Conveyance and Warranty:**

1. Standby fees, taxes and assessments by any taxing authority for the current year, and subsequent years; and subsequent taxes and assessments by any taxing authority for prior years due to change in land usage or ownership, but not those taxes or assessments for prior years because of an exemption granted to a previous owner of the property under Section 11.13, Texas Tax Code, or because of improvements not assessed for a previous tax year.
2. Any visible or apparent roadway depicted on Exhibits A-C, if any, or easement over or across the subject property, the existence of which does not appear of record.
3. Easement as shown in instrument from John Norris to Texas Pipeline Company, dated November 4, 1945 and filed in Volume 183, page 290, Deed Records of Wharton County, Texas.
4. Easement as shown in instrument from John Norris to George K. Taggart, dated March 19, 1946 and filed in Volume 186, page 57, Deed Records of Wharton County, Texas.
5. Easement as shown in instrument from John Norris to Texas Pipeline Co., dated August 28, 1946 and filed in Volume 188, page 75, Deed Records of Wharton County, Texas.
6. Easement as shown in instrument from Johnnie Hobbs, et al to Texas Pipeline Company, dated June 30, 1951 and filed in Volume 242, page 181, Deed Records of Wharton County, Texas.
7. Easement as shown in instrument from J.R. Cox to Texas Central Power Co., dated January 28, 1926 and filed in Volume 73, page 193, Deed Records of Wharton County, Texas.
8. Easement as shown in instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 276, page 56, Deed Records of Wharton County, Texas.
9. Easement as shown in instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 282, page 450, Deed Records of Wharton County, Texas.



10. Easement as shown in instrument from G.W. Townsend to Atlantic Refining Co., dated April 28, 1956 and filed in Volume 289, page 486, Deed Records of Wharton County, Texas.
11. Easement for electric transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated August 12, 1975 and filed in Volume 458, page 382, Deed Records of Wharton County, Texas.
12. Easement for electrical transmission line as shown in instrument from Lois Ann Hecker to C.P. & L. , dated June 16, 1955 and filed in Volume 282, page 448, Deed Records of Wharton County, Texas.
13. Easement for electrical transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, page 409, Deed Records of Wharton County, Texas.
14. 10 ft. wide easement for electrical lines as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, page 408, Deed Records of Wharton County, Texas.
15. Easement for electric transmission line as shown in instrument from Ada Houston Cox to C.P. & L. , dated May 12, 1955 and filed in Volume 284, page 278, Deed Records of Wharton County, Texas.
16. Easement for pipeline as shown in instrument from Ada Houston Cox to Sohio Petroleum Co., dated June 30, 1954 and filed in Volume 270, page 565, Deed Records of Wharton County, Texas.
17. Easement for electric transmission line as shown in instrument from J.R. Cox to Houston Lighting & Power Co., dated March 29, 1926 and filed in Volume 74, page 222, Deed Records of Wharton County, Texas.
18. Easement for electric transmission line as shown in instrument from Ada H. Cox to H.L. & P., dated March 2, 1961 and filed in Volume 347, page 207, Deed Records of Wharton County, Texas.
19. Easement for electrical transmission line as shown in instrument from T. Gordon, et al to Houston Lighting & Power Co., dated January 12, 1961 and filed in Volume 327, page 556, Deed Records of Wharton County, Texas.
20. 22 ft. wide easement for road along Northwest line of subject property as shown by Plat of said Subdivision, filed in Volume 37, page 640, Deed Records of Wharton County, Texas.
21. The following mineral and/or royalty interests:
  - a. That certain minerals reserved in deed dated May 10, 1935 by Security Bank and Trust Co. in deed to John Norris on 400 acres described as follows:
 

All of Lots 3, 4, 5, 6, 7, 8 and 9; all of Lot 10, except the Westerly 12.2 acres of same, all of Lot 11, except the Westerly 19 acres; all of Lot 12 except the Westerly 16.7 acres which said lots lie in Block 103 of Missouri-Lincoln Trust Company's resubdivision of parts of leagues of land in the County of Wharton and State of Texas.

The South 5 acres out of Lot 2; all of Lots 3, 4 and 5 which said lots lie in block 102 of the aforesaid resubdivision.

And the East 7.43 acres off Lot 7 out of Block 101 of said resubdivision, which above described lands contain 400 acres, more or less.

Said Deed is recorded in Volume 116, Page 213 of the Wharton County Deed Records.
  - b. That certain minerals reserved by Susan L. Houston in Deed dated May 20, 1937 to Ada Houston Cox recorded in Volume 130, Page 384 of the Wharton County Deed Records, on 423-45/100 acres described as follows:
 

Being the West portion of Lot 38, consisting of 115-8/10 acres and 307-65/100 acres out of Lots 47 and 70 of the Colonial Land Company's Subdivision recorded in Vol. 24, Page 213 of the Wharton County Deed Records, and being more particularly described on the attached exhibit.

- c. That certain minerals reserved by The Security Bank & Trust Co. in Deed dated March 20, 1940 to John Norris recorded in Volume 147, Page 395 of the Wharton County Deed Records, on 183.66 acres described as follows:
- All of the following lots out of Block 101 of the Missouri-Lincoln Trust Company's Resubdivision, Wharton County, Texas, to-wit: Lots 1, 2, 3, 4, 5, 6, the East 7.43 acres of Lot 8, 9, 10, 14, 15, 16 and 17.
- Lot 13 in Block 1 of Colonial Land Company's resubdivision of Timber Lots in Wharton County, Texas, said lot being also known as Lot 13, Block 101 of the Taylor-Fowler Land Company's Resubdivision of the Colonial Land Company's Subdivision above mentioned.
- Lot 1 in Block 102 of the Taylor-Fowler Land Company's Resubdivision.
- EXCEPT the South 5 acres, Lot 2 of Block 102 of the Missouri-Lincoln Trust Company's Resubdivision, Wharton County, Texas.
- That part of Lot 13 in Block 105 lying West of Jarvis Creek according to the plat of the Missouri-Lincoln Trust Company's Resubdivision, Wharton County, Texas.
- In the above description of lot and block numbers of Lot 13, Block 1 of the Colonial Land Company's Subdivision of Timber Lots in Wharton County, Texas, and Lot 1 in Block 102 of the Taylor-Fowler Land Company's Resubdivision are the same lots of land respectively as Lot 13 in Block 101 and Lot 1 in Block 102 of the Missouri-Lincoln Trust Company's Resubdivision in Wharton County, Texas.
- The lots of land herein described contain in the aggregate 183.66 acres, more or less, and are more particularly described in the attached exhibit.
- d. That certain minerals reserved by Roberta P. Tinsley and husband, J.R. Tinsley, in Deed dated July 1, 1948 to Johnnie Hobbs, recorded in Vol. 209, Page 312 of the Wharton County Deed Records, on 40 acres described as follows:
- Being all of Lots 1 and 2 of Block 103 of a resubdivision of the Missouri-Lincoln Trust Company's lands in Wharton County, Texas, as shown by map of said resubdivision on record in the County records of Wharton County, Texas, in Block No. 37 at page 640, and the identical land described in a deed to Roberta Partain Tinsley by J.R. Tinsley dated May 8, 1934 recorded in Vol. 108, Page 203 of the Wharton County Deed Records, to which Deed and map and the said records thereof reference is here made for more particular description and identification of said land.
- e. That certain royalties reserved by Lois A. Hecker in Deed dated October 3, 1957 to Sutherland Branch, Incorporated, recorded in Vol. 302, Page 118 of the Wharton County Deed Records, all executory rights are conveyed by this deed. The land covered is 20 acres described as follows:
- Lots 11 and 12 of Block 101 of the Missouri-Lincoln Trust Company's Resubdivision of parts of Leagues of land in Wharton County, Texas, according to plat thereof found of record in Vol. 37, Page 640 of the Wharton County Deed Records; said lots jointly containing 20 acres of land, more or less, and being in the S. Castleman Survey No. 4, Abst. 11, and being the same land as is described in Deed from Missouri-Lincoln Trust Company to E. Claude Hecker dated May 21, 1917 and recorded in Vol. 46, Page 25 of the Wharton County Deed Records.
- f. That certain royalties conveyed to Floyd Henderson in Deed dated March 6, 1958 and recorded in Vol. 312, Page 130 from Tom D. Henderson, Individually and as President of Sutherland Branch, Incorporated; the full executory rights reserved; said land being 20 acres described as follows:
- Lots 11 and 12, Block 101 of the Missouri-Lincoln Trust Company's Resubdivision, Wharton County, Texas; being the identical land as described in Item e. herein.

- h. That certain minerals reserved by Johnnie Hobbs, a feme sole, Susie N. LeFort, joined by her husband, A.J. LeFort, Jr. and Forrest N. Kaiser, joined by her husband, A.F. Kaiser, in deed dated October 20, 1951 to Richard Frank, Jr. and wife, Elsie Frank, recorded in Vol. 244, Page 11 of the Wharton County Deed Records; said land being the South 300 acres out of a 700.7 acre tract and described as follows:
- The following described tracts of parcels of land out of the Missouri-Lincoln Trust Company's Resubdivision of the Sylvanus Castleman League Abst. 12 and the Sylvanus Castleman League, Abst. 11 and other surveys according to the plat of said resubdivision recorded in Vol. 37, following Page 640 of the Wharton County Deed Records;
- The following described land situated in Block 101 of said resubdivision: Lots 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, 16, 17, 18 and 19.
- The following described land situated in Block 102 of said resubdivision: All of Lots 1, 2, 3, 4 and 5.
- The following described land situated in Block 103 of said resubdivision: All of Lots 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12.
- The following described land situated in Block 105 of said resubdivision: All of that part of Lot 13 lying West of Jarvis Creek.
- The above described tracts of land containing a total of 700.7 acres of land, more or less.
- i.. Terms, conditions and stipulations of mineral lease covering acreage described in Item 8 above, dated January 29, 1940 from John Norris, et al to W.L. Ruff, recorded in Volume 145, Page 197 of the Wharton County Deed Records.
- j. That certain mineral interest, the royalties, bonuses, rentals and all other rights in connection with said mineral rights, as reserved in perpetuity in instrument dated July 3, 1971, executed by Estate of Ada Huges Cargile, Deceased in favor of Henderson Farms, Inc., recorded in Volume 418, Page 355 of the Deed Records of Wharton County, Texas.
- k. Terms, conditions and stipulations of mineral lease dated January 6, 1975 from Henderson Farms, Inc. to Boling Prod. Co., recorded in Volume 451, Page 333 of the Wharton County Deed Records.
- l. That certain royalty interest as reserved in perpetuity in instrument dated December 9, 1972, executed by Leona Gordon Oettinger, et al to Henry Weid, recorded in Volume 430, Page 398 of the Wharton County Deed Records.
- m. Royalty Deed, Mrs. Susan L. Houston to Mrs. Roberta Partin Tinsley, dated February 10, 1936, recorded in Volume 119, on Page 543 of the Wharton County Deed Records (1/32nd)
- The West 100 acres out of 306 acres in the Colonial Land Company's Subdivision recorded in Volume 24, Page 213 of the Wharton County Deed Records; the said 100 acres being a part of Block 70 of said Subdivision.
- n. Royalty Deed, Security Bank & Trust Company to J.D. Hedley, dated August 17, 1940 and recorded in Vol. 148, Page 591, of the Wharton County Deed Records (1/2)
- A total of 660.7 acres, more or less, out of the Missouri-Lincoln Trust Company's Resubdivision of the Sylvanus Castleman League, Abstract 12, The Sylvanus Castleman League, Abstract 11, and other surveys, according to the plat of said resubdivision recorded in Vol. 37, Page following 640 of the Wharton County Deed Records.
- The following described land situated in Block 101 of said resubdivision: All of Lots 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, 16, 17, 18 and 19.
- The following described land situated in Block 102 of said resubdivision: All of Lots 1, 2, 3, 4, and 5.
- The following described land situated in Block 103 of said resubdivision: All of Lots 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12.

The following described land situated in Block 105 of said resubdivision: All of that part of Lot 13, lying West of Jarvis Creek.

- o. Royalty Deed, J.D. Hedley to J.B. Carter dated August 17, 1940 and recorded in Vol. 152, Page 280 of the Wharton County Deed Records (1/8th).
- p. Royalty Deed, Susan L. Houston, a feme sole, widow of W.B. Houston, deceased, to Texas Gulf Producing Company dated October 6, 1942 and recorded in Volume 160, Page 235 of the Wharton County Deed Records; covering a total of 423.45 acres in the Sylvanus Castleman Leagues, Abst. 11 and 12 and the John McCrosky Survey, Abstract 630 and portions of Lots 38, 47 and 70 of the Colonial Land Co. subdivision, Wharton County, Texas. (1/8th)
- r. Royalty Deed, Johnnie Hobbs, a feme sole, Susie N. LeFort, joined by her husband, A.J. LeFort, Jr. and Forrest N. Kaiser, joined by her husband, A.F. Kaiser, to Richard Frank, Jr. et ux, dated October 20, 1951 recorded in Vol. 244, Page 11 of the Wharton County Deed Records, for a period of 20 years from October 20, 1951, on 400.7 acres, being all of the 700.7 acres tract less the South 300 acres reserved in said deed dated October 20, 1951. (1/2)
- s. That certain mineral interest, the royalties, bonuses, rentals and all other rights in connection with said mineral rights, as reserved in perpetuity in instrument dated December 23, 1977 executed by Henderson Farms, Inc. in favor of Caravelas Co., N.V., recorded in Volume 491, Page 186 of the Deed Records of Wharton County, Texas.
- t. Title to any portion of subject tracts which lies within any public road right-of-way, canal or railroad right-of-way, as shown on the Plat of the Missouri-Lincoln Trust Co., resubdivision, recorded in Vol. 37, Page 640, of the Deed Records of Wharton County, Texas.

This conveyance includes all interest of Grantor, if any, in (a) strips and gores, if any, between the above described property and any abutting properties, whether owned or claimed by deed, limitations, or otherwise, and whether located inside or outside the above described property; and (b) any land lying in or under the bed or any creek, stream, or waterway or any highway, avenue, street, road, alley, easement or right-of-way, open or proposed, in, on, across, abutting, or adjacent to the above described property; and (c) all other interest of every kind and character which Grantor now has or at any time hereafter acquires in and to the above described property and all property which is used or useful in connection with the above described property, including all rights, privileges and appurtenances pertaining thereto; including but not limited to, easements, rights-of-way, water rights, claims and permits, and all rights, and obligations of applicable government programs and cooperative or association memberships applicable to the above described property.

Grantor conveys to Grantee the right to pursue any claims for damages against any third party who may have damaged the Property during the Grantor's ownership thereof.

Grantor, for the Consideration and subject to the Reservations from Conveyance and the Exceptions to Conveyance and Warranty, grants, sells, and conveys to Grantee the Property, together with all and singular the rights and appurtenances thereto in any way belonging, to have and to hold it to Grantee and Grantee's heirs, successors, and assigns forever. Grantor binds Grantor and Grantor's heirs and successors to warrant and forever defend all and singular the Property to Grantee and Grantee's heirs, successors, and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof when the claim is by, through, or under Grantor but not otherwise, except as to the Reservations from Conveyance and the Exceptions to Conveyance and Warranty.

When the context requires, singular nouns and pronouns include the plural.

CARAVELAS COMPANY, a Delaware  
corporation, successor by domestication to  
CARAVELAS COMPANY, N.V., a Netherlands  
Antilles Company

By:

  
S. BYRON BALBACH, JR., President

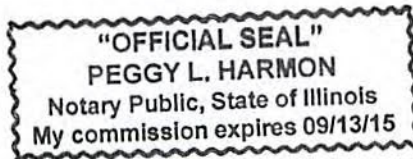


STATE OF ILLINOIS )

COUNTY OF CHAMPAIGN )

This instrument was acknowledged before me on 26th day of June, 2013, by S. BYRON BALBACH, JR., President of CARAVÉLAS COMPANY, on behalf of said company.

  
\_\_\_\_\_  
Notary Public, State of Illinois



PREPARED IN THE OFFICE OF AND  
AFTER RECORDING RETURN TO:

Duckett, Bouligny & Collins, LLP  
207 W. Jackson  
P.O. Box 1567  
El Campo, TX 77437  
Tel: (979) 543-6845  
Fax: (979) 543-9516

Y:\ABC Clients\Caravelas Company, Inc\LCRA\Special Warranty Deed.WPD

EXHIBIT " A "

BEING A 1063.187 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11 AND SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12, BOTH IN WHARTON COUNTY, TEXAS, SAID 1063.187 ACRE TRACT OF LAND BEING A PORTION OF BLOCK 38, BLOCK 39, BLOCK 47, AND BLOCK 70, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 1063.187 ACRE TRACT OF LAND ALSO BEING A PORTION OF LOT 13, LOT 14, LOT 15, AND LOT 16, BLOCK 101 OF SAID RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, SAID 1063.187 ACRE TRACT OF LAND BEING ALL OF LOT 1, LOT 2, LOT 3, LOT 4, LOT 5, LOT 6, LOT 7, LOT 8, LOT 9, LOT 10, LOT 11, LOT 12, LOT 17, LOT 18, AND LOT 19, BLOCK 101, OF SAID RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, SAID 1063.187 ACRE TRACT OF LAND BEING ALL OF LOT 1, LOT 2, LOT 3, LOT 4, AND LOT 5, BLOCK 102, OF SAID RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, SAID 1063.187 ACRE TRACT OF LAND BEING ALL OF LOT 1, LOT 2, LOT 3, LOT 4, LOT 5, LOT 6, LOT 7, LOT 8, LOT 9, LOT 10, LOT 11, AND LOT 12, BLOCK 103, OF SAID RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, SAID 1063.187 ACRE TRACT OF LAND BEING A PORTION OF LOT 13, BLOCK 105, OF SAID RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, SAID 1063.187 ACRE TRACT OF LAND BEING ALL OF TRACT I, A 1059.68 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM HENDERSON FARMS, INC., TO CARAVELAS COMPANY, N.V., EXECUTED JANUARY 3, 1977, RECORDED IN VOLUME 491, PAGE 186, D.R.W.C.T., SAID 1063.187 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

**BEGINNING** at an axle found (Grid Coordinates N=9,697,617.94 US Feet, E=3,662,320.72 US Feet) for an interior ell corner of said Tract I and for the northwest corner of a 277.33 acre tract of land (by deed), described in deed from F. D. Gavranovic to F. D. Gavranovic, Jr., executed October 29, 1997, recorded in Volume 255, Page 813 of the Official Records of Wharton County, Texas, (O.R.W.C.T.);

**THENCE** South 31 degrees 56 minutes 22 seconds East, with an interior line of said Tract I and with the southwest line of said 277.33 acre tract of land, a distance of 1628.93 feet to a 5/8 inch iron rod found for an exterior ell corner of said Tract I and for the south corner of said 277.33 acre tract of land, said 5/8 inch iron rod being in the south line of said Block 70, in the north line of Block 71 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, and in the north line of Tract Three, a 188.69 acre tract of land (by deed), described in deed from Joan Reid Anderson and husband, Keith Anderson to Jean Reid Severn, executed November 1, 1979, recorded in Volume 525, Page 612, D.R.W.C.T.;

**THENCE** South 59 degrees 50 minutes 29 seconds West, with an interior line of said Tract I, with the north line of said Tract Three, with the south line of said Block 70, and with the north line of said Block 71, passing at a distance of 1914.13 feet, a 5/8 inch iron rod with cap stamped "GORRONDONA" set for reference, in all, a distance of 1964.13 feet to a calculated point in the approximate centerline of Jarvis Creek, for an interior ell corner of said Tract I and for the west corner of said Tract Three;

**THENCE**, with an interior line of said Tract I, with the southwest line of said Tract Three, with the west line of a 562.205 acre tract of land (by deed), described in deed from Maxim Productions Co., LP to DCVK, Limited Partnership, executed May 9, 2005, recorded in Volume 607, Page 247, O.R.W.C.T., and with the approximate centerline of Jarvis Creek the following eighty-six (86) courses:

1. South 28 degrees 01 minute 51 seconds East, a distance of 58.58 feet to a point for corner;
2. South 18 degrees 38 minutes 44 seconds East, a distance of 79.27 feet to a point for corner;
3. North 89 degrees 52 minutes 18 seconds East, a distance of 198.90 feet to a point for corner;
4. South 48 degrees 32 minutes 13 seconds East, a distance of 149.25 feet to a point for corner;
5. South 06 degrees 02 minutes 26 seconds East, a distance of 118.89 feet to a point for corner;
6. South 07 degrees 06 minutes 59 seconds East, a distance of 160.38 feet to a point for corner;

7. South 09 degrees 20 minutes 23 seconds East, a distance of 135.19 feet to a point for corner;
8. South 60 degrees 18 minutes 44 seconds East, a distance of 183.95 feet to a point for corner;
9. South 80 degrees 57 minutes 58 seconds East, a distance of 74.19 feet to a point for corner;
10. South 80 degrees 34 minutes 22 seconds East, a distance of 141.05 feet to a point for corner;
11. South 60 degrees 44 minutes 04 seconds East, a distance of 85.28 feet to a point for corner;
12. South 39 degrees 37 minutes 15 seconds East, a distance of 69.33 feet to a point for corner;
13. South 24 degrees 02 minutes 21 seconds East, a distance of 118.86 feet to a point for corner;
14. South 17 degrees 24 minutes 47 seconds East, a distance of 138.99 feet to a point for corner;
15. South 10 degrees 07 minutes 00 seconds East, a distance of 67.56 feet to a point for corner;
16. South 25 degrees 03 minutes 07 seconds East, a distance of 106.82 feet to a point for corner;
17. South 39 degrees 44 minutes 27 seconds East, a distance of 107.71 feet to a point for corner;
18. South 16 degrees 30 minutes 02 seconds East, a distance of 116.16 feet to a point for corner;
19. South 14 degrees 20 minutes 05 seconds West, a distance of 77.99 feet to a point for corner;
20. South 82 degrees 20 minutes 02 seconds West, a distance of 29.00 feet to a point for corner;
21. South 27 degrees 22 minutes 19 seconds West, a distance of 126.62 feet to a point for corner;
22. South 03 degrees 56 minutes 55 seconds West, a distance of 153.86 feet to a point for corner;
23. South 05 degrees 16 minutes 16 seconds West, a distance of 74.70 feet to a point for corner;
24. South 06 degrees 59 minutes 08 seconds East, a distance of 120.00 feet to a point for corner;
25. South 39 degrees 23 minutes 46 seconds East, a distance of 67.81 feet to a point for corner;
26. North 87 degrees 01 minute 53 seconds East, a distance of 46.12 feet to a point for corner;
27. South 59 degrees 31 minutes 40 seconds East, a distance of 34.36 feet to a point for corner;
28. South 80 degrees 36 minutes 22 seconds East, a distance of 135.33 feet to a point for corner;
29. South 81 degrees 40 minutes 25 seconds East, a distance of 130.28 feet to a point for corner;
30. South 75 degrees 27 minutes 32 seconds East, a distance of 92.30 feet to a point for corner;

31. South 88 degrees 57 minutes 14 seconds East, a distance of 77.31 feet to a point for corner;
32. North 67 degrees 05 minutes 20 seconds East, a distance of 108.75 feet to a point for corner;
33. North 65 degrees 43 minutes 19 seconds East, a distance of 129.72 feet to a point for corner;
34. North 84 degrees 57 minutes 55 seconds East, a distance of 44.22 feet to a point for corner;
35. South 71 degrees 20 minutes 36 seconds East, a distance of 37.18 feet to a point for corner;
36. South 51 degrees 48 minutes 51 seconds East, a distance of 29.81 feet to a point for corner;
37. South 01 degree 08 minutes 11 seconds East, a distance of 44.70 feet to a point for corner;
38. South 53 degrees 06 minutes 12 seconds East, a distance of 85.79 feet to a point for corner;
39. South 00 degrees 52 minutes 20 seconds East, a distance of 55.77 feet to a point for corner;
40. South 16 degrees 28 minutes 27 seconds East, a distance of 109.57 feet to a point for corner;
41. South 00 degrees 02 minutes 45 seconds West, a distance of 73.15 feet to a point for corner;
42. South 00 degrees 08 minutes 02 seconds East, a distance of 128.00 feet to a point for corner;
43. South 86 degrees 53 minutes 25 seconds West, a distance of 47.89 feet to a point for corner;
44. South 09 degrees 46 minutes 18 seconds West, a distance of 111.53 feet to a point for corner;
45. South 29 degrees 17 minutes 13 seconds East, a distance of 100.34 feet to a point for corner;
46. South 13 degrees 01 minute 03 seconds East, a distance of 87.59 feet to a point for corner;
47. South 14 degrees 07 minutes 01 second West, a distance of 93.88 feet to a point for corner;
48. South 63 degrees 51 minutes 24 seconds West, a distance of 46.39 feet to a point for corner;
49. South 02 degrees 30 minutes 20 seconds East, a distance of 82.42 feet to a point for corner;
50. South 01 degree 24 minutes 32 seconds West, a distance of 86.52 feet to a point for corner;
51. South 33 degrees 38 minutes 43 seconds East, a distance of 77.27 feet to a point for corner;
52. South 74 degrees 08 minutes 20 seconds East, a distance of 72.88 feet to a point for corner;
53. South 40 degrees 54 minutes 30 seconds East, a distance of 50.74 feet to a point for corner;
54. South 29 degrees 00 minutes 14 seconds East, a distance of 94.99 feet to a point for corner;

55. South 86 degrees 55 minutes 06 seconds East, a distance of 61.34 feet to a point for corner;
56. South 57 degrees 13 minutes 23 seconds East, a distance of 88.10 feet to a point for corner;
57. South 19 degrees 37 minutes 43 seconds East, passing at a distance of 122.89 feet, a calculated point for the south corner of said Tract Three and for the most northerly northwest corner of said 562.205 acre tract of land, from which a 1/2 inch iron pipe with cap stamped "KALKOMEY" found for reference, bears, North 59 degrees 42 minutes 23 seconds East, a distance of 75.12 feet, continuing in all, a distance of 128.18 feet to a point for corner;
58. South 27 degrees 14 minutes 19 seconds East, a distance of 185.00 feet to a point for corner;
59. South 40 degrees 47 minutes 52 seconds East, a distance of 183.43 feet to a point for corner;
60. South 64 degrees 50 minutes 48 seconds East, a distance of 105.85 feet to a point for corner;
61. South 24 degrees 38 minutes 19 seconds East, a distance of 54.92 feet to a point for corner;
62. South 00 degrees 18 minutes 13 seconds East, a distance of 94.12 feet to a point for corner;
63. South 07 degrees 25 minutes 32 seconds West, a distance of 149.66 feet to a point for corner;
64. South 25 degrees 17 minutes 52 seconds East, a distance of 54.27 feet to a point for corner;
65. South 20 degrees 12 minutes 42 seconds West, a distance of 51.76 feet to a point for corner;
66. South 65 degrees 42 minutes 02 seconds West, a distance of 209.64 feet to a point for corner;
67. South 72 degrees 42 minutes 01 seconds West, a distance of 106.48 feet to a point for corner;
68. South 70 degrees 56 minutes 11 seconds West, a distance of 96.58 feet to a point for corner;
69. South 44 degrees 12 minutes 37 seconds West, a distance of 97.58 feet to a point for corner;
70. South 48 degrees 26 minutes 53 seconds West, a distance of 83.63 feet to a point for corner;
71. South 02 degrees 51 minutes 44 seconds East, a distance of 138.48 feet to a point for corner;
72. South 65 degrees 29 minutes 59 seconds East, a distance of 178.02 feet to a point for corner;
73. North 81 degrees 29 minutes 13 seconds East, a distance of 153.93 feet to a point for corner;
74. South 78 degrees 57 minutes 01 second East, a distance of 37.45 feet to a point for corner;
75. South 04 degrees 32 minutes 19 seconds West, a distance of 60.94 feet to a point for corner;
76. South 48 degrees 30 minutes 34 seconds West, a distance of 137.38 feet to a point for corner;
77. South 34 degrees 33 minutes 32 seconds West, a distance of 159.54 feet to a point for corner;

78. South 49 degrees 47 minutes 05 seconds West, a distance of 76.20 feet to a point for corner;
79. South 34 degrees 48 minutes 35 seconds West, a distance of 132.76 feet to a point for corner;
80. South 48 degrees 14 minutes 14 seconds East, a distance of 79.44 feet to a point for corner;
81. North 79 degrees 59 minutes 35 seconds East, a distance of 113.63 feet to a point for corner;
82. South 46 degrees 11 minutes 35 seconds East, a distance of 95.36 feet to a point for corner;
83. South 09 degrees 22 minutes 37 seconds East, a distance of 168.13 feet to a point for corner;
84. South 04 degrees 30 minutes 02 seconds West, a distance of 80.21 feet to a point for corner;
85. South 30 degrees 05 minutes 17 seconds West, a distance of 62.90 feet to a point for corner;
86. South 58 degrees 57 minutes 30 seconds West, a distance of 155.91 feet to a point for the intersection of an interior line of said Tract I, the west line of said 562.205 acre tract of land, and the approximate centerline of Jarvis Creek with the approximate east vegetation line of the Colorado River;

**THENCE**, with the southwest line of said Tract I and with the approximate east vegetation line of the Colorado River, the following 46 courses:

1. North 61 degrees 36 minutes 19 seconds West, a distance of 320.75 feet to a point for corner;
2. North 70 degrees 59 minutes 03 seconds West, a distance of 246.36 feet to a point for corner;
3. North 73 degrees 41 minutes 20 seconds West, a distance of 242.77 feet to a point for corner;
4. North 82 degrees 05 minutes 46 seconds West, a distance of 303.56 feet to a point for corner;
5. North 80 degrees 41 minutes 26 seconds West, a distance of 415.25 feet to a point for corner;
6. North 88 degrees 37 minutes 34 seconds West, a distance of 308.32 feet to a point for corner;
7. South 81 degrees 55 minutes 41 seconds West, a distance of 367.60 feet to a point for corner;
8. South 72 degrees 03 minutes 48 seconds West, a distance of 468.59 feet to a point for corner;
9. South 46 degrees 28 minutes 14 seconds West, a distance of 345.71 feet to a point for corner;
10. South 40 degrees 09 minutes 24 seconds West, a distance of 275.10 feet to a point for corner;
11. South 49 degrees 22 minutes 52 seconds West, a distance of 337.02 feet to a point for corner;
12. South 60 degrees 15 minutes 38 seconds West, a distance of 387.68 feet to a point for corner;
13. South 49 degrees 45 minutes 10 seconds West, a distance of 347.05 feet to a point for corner;
14. South 67 degrees 58 minutes 53 seconds West, a distance of 308.96 feet to a point for corner;

15. South 82 degrees 38 minutes 26 seconds West, a distance of 280.62 feet to a point for corner;
16. North 84 degrees 43 minutes 54 seconds West, a distance of 214.62 feet to a point for corner;
17. North 57 degrees 25 minutes 50 seconds West, a distance of 289.27 feet to a point for corner;
18. North 62 degrees 47 minutes 38 seconds West, a distance of 250.84 feet to a point for corner;
19. North 35 degrees 33 minutes 13 seconds West, a distance of 181.38 feet to a point for corner;
20. North 12 degrees 25 minutes 32 seconds West, a distance of 145.05 feet to a point for corner;
21. North 13 degrees 42 minutes 22 seconds East, a distance of 212.46 feet to a point for corner;
22. North 21 degrees 38 minutes 10 seconds East, a distance of 201.59 feet to a point for corner;
23. North 30 degrees 26 minutes 43 seconds East, a distance of 435.57 feet to a point for corner;
24. North 27 degrees 43 minutes 01 second East, a distance of 411.93 feet to a point for corner;
25. North 15 degrees 42 minutes 30 seconds East, a distance of 730.73 feet to a point for corner;
26. North 04 degrees 20 minutes 29 seconds East, a distance of 288.07 feet to a point for corner;
27. North 10 degrees 04 minutes 53 seconds East, a distance of 432.43 feet to a point for corner;
28. North 12 degrees 54 minutes 53 seconds East, a distance of 486.28 feet to a point for corner;
29. North 16 degrees 36 minutes 51 seconds East, a distance of 529.37 feet to a point for corner;
30. North 00 degrees 53 minutes 17 seconds East, a distance of 269.82 feet to a point for corner;
31. North 17 degrees 53 minutes 16 seconds West, a distance of 183.85 feet to a point for corner;
32. North 35 degrees 59 minutes 28 seconds West, a distance of 428.15 feet to a point for corner;
33. North 43 degrees 08 minutes 57 seconds West, a distance of 146.40 feet to a point for corner;
34. North 56 degrees 23 minutes 36 seconds West, a distance of 377.55 feet to a point for corner;
35. North 84 degrees 41 minutes 17 seconds West, a distance of 392.71 feet to a point for corner;
36. South 85 degrees 13 minutes 37 seconds West, a distance of 354.23 feet to a point for corner;
37. North 71 degrees 24 minutes 30 seconds West, a distance of 223.94 feet to a point for corner;
38. North 68 degrees 28 minutes 45 seconds West, a distance of 327.58 feet to a point for corner;

39. North 57 degrees 37 minutes 06 seconds West, a distance of 231.74 feet to a point for corner;
40. North 29 degrees 08 minutes 20 seconds West, a distance of 210.06 feet to a point for corner;
41. North 08 degrees 37 minutes 31 seconds West, a distance of 171.38 feet to a point for corner;
42. North 16 degrees 26 minutes 01 second West, a distance of 154.34 feet to a point for corner;
43. North 10 degrees 44 minutes 04 seconds West, a distance of 160.03 feet to a point for corner;
44. North 09 degrees 01 minute 57 seconds East, a distance of 212.00 feet to a point for corner;
45. North 27 degrees 31 minutes 50 seconds West, a distance of 95.98 feet to a point for corner;
46. North 22 degrees 42 minutes 36 seconds West, a distance of 43.57 feet to a point for an exterior ell corner of said Tract I and being in the south line of a 9.979 acre tract of land (by deed), described in a deed from Henderson Farms, Inc. to Lower Colorado River Authority, executed February 7, 1967, recorded in Volume 380, Page 680, D.R.W.C.T.;

**THENCE**, with an interior line of said Tract I and with an interior line of said 9.979 acre tract of land, the following five (5) courses:

1. South 89 degrees 31 minutes 24 seconds East, a distance of 234.75 feet to a concrete monument stamped "L.C.R.A." found for an interior ell corner of said Tract I and for the southeast corner of said 9.979 acre tract of land;
2. North 00 degrees 28 minutes 36 seconds East, a distance of 646.77 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for an interior ell corner of said Tract I and for an exterior ell corner of said 9.979 acre tract of land;
3. North 42 degrees 41 minutes 24 seconds West, a distance of 445.21 to a concrete monument stamped "L.C.R.A." found for an exterior ell corner of said Tract I and for an interior ell corner of said 9.979 acre tract of land;
4. North 59 degrees 48 minutes 36 seconds East, a distance of 533.69 feet to a broken concrete monument found for an interior ell corner of said Tract I and for the most easterly corner of said 9.979 acre tract of land;
5. North 38 degrees 21 minutes 24 seconds West, a distance of 202.05 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the most northerly northwest corner of said Tract I and for the most northerly corner of said 9.979 acre tract of land, in the southeast line of a 17.9 acre tract of land (by deed), described in deed from Gulf Coast Water Company to County of Wharton, Texas, executed June 28, 1939, recorded in Volume 139, Page 608, D.R.W.C.T.;

**THENCE** North 59 degrees 45 minutes 54 seconds East, with the northwest line of said Tract I and with the southeast line of said 17.9 acre tract of land, a distance of 9414.24 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the most northerly corner of said Tract I, in the southwest line of Tract No. 2, a 129.3 acre tract of land (by deed), described in deed from Gulf Coast Rice Farms, Inc. to Gulf Coast Water Company, executed February 20, 1952, recorded in Volume 249, Page 109, D.R.W.C.T. and also being in the southwest line of "Lane City Section" (by deed), described in deed from Gulf Coast Water Company to Lower Colorado River Authority, executed December 31, 1959, recorded in Volume 318, Page 396, D.R.W.C.T.;

**THENCE**, with the northeast line of said Tract I, with the southwest line of said Tract No. 2, and with the southwest line of "Lane City Section" the following two (2) courses:

1. South 30 degrees 18 minutes 36 seconds East, a distance of 1223.14 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;
2. Around a curve to the left, an arc distance of 418.11 feet, having a radius of 458.00 feet, a central angle of 52 degrees 18 minutes 19 seconds, and whose chord bears South 56 degrees 27 minutes 45 seconds East, a distance of 403.74 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the most easterly corner of said Tract I and for an exterior ell corner of said 277.33 acre tract of land;



Wharton County, Texas  
Sylvanus Castleman Survey No. 4, Abstract No. 11  
Sylvanus Castleman Survey No. 5, Abstract No. 12  
Lower Colorado River Authority

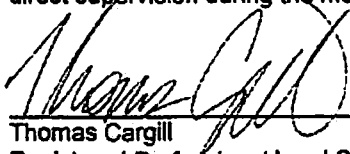
1063.187 Acres  
Page 8 of 12

**THENCE** South 60 degrees 08 minutes 23 seconds West, with an interior line of said Tract I and with the northwest line of said 277.33 acre tract of land, a distance of 4859.52 feet to the **POINT OF BEGINNING**, and containing 1063.187 acres of land, more or less.

Bearing Basis: Texas Lambert Grid, Central Zone, NAD83/NSRS2007.

All distances are surface values and in U. S. Survey Feet. To compute grid values multiply surface distances by a Combined Scale Factor of 1.00037640.

The field notes and the plat attached hereto represent an on-the-ground survey made under my direct supervision during the months of September 2012 to November 2012.



Thomas Cargill  
Registered Professional Land Surveyor No. 5835  
Gorrondona and Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933



Word File: LCRAW114A-0005B.DOC  
Drawing File: LCRAW114A-0005B.DWG

WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11  
 SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12

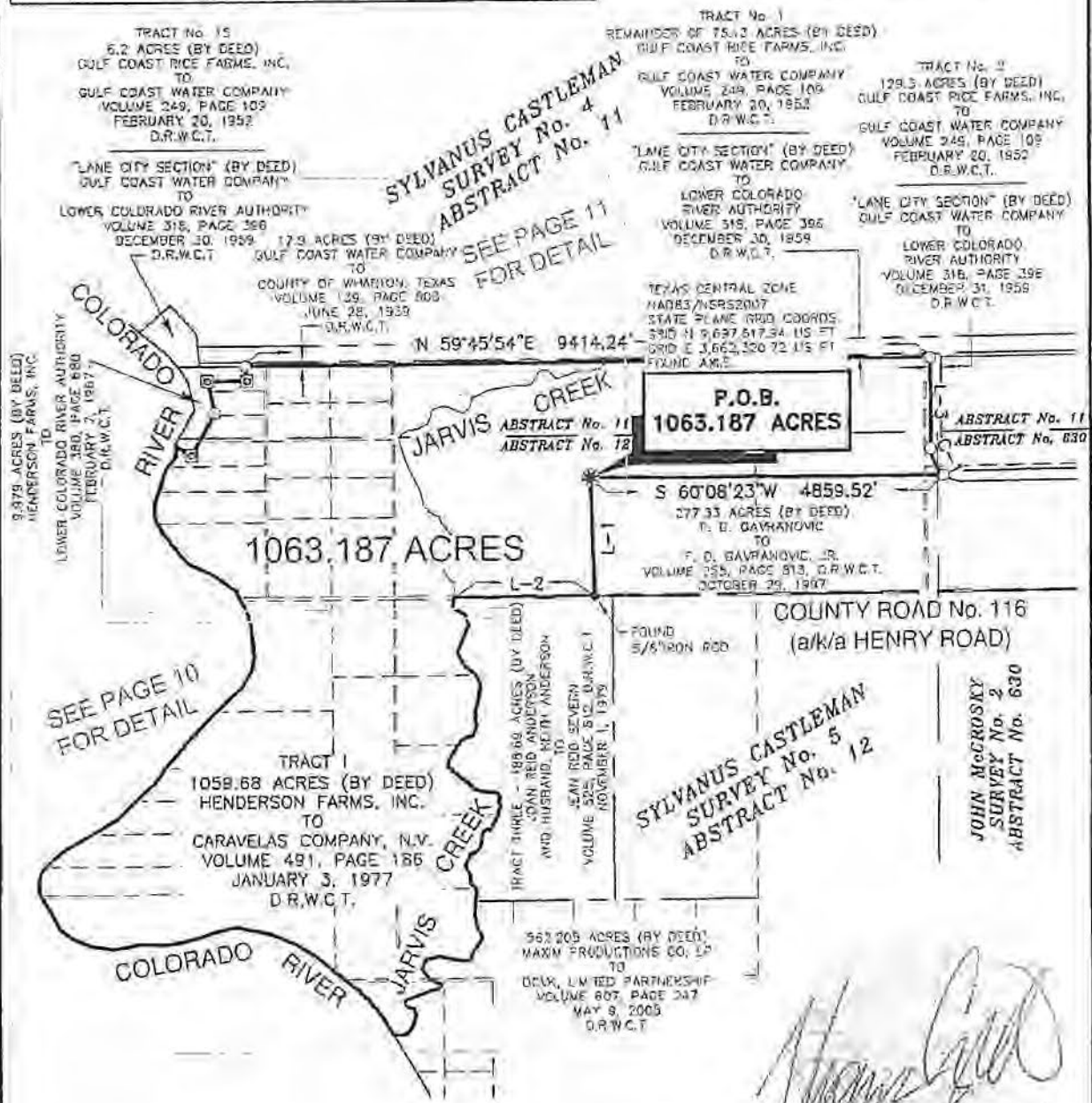
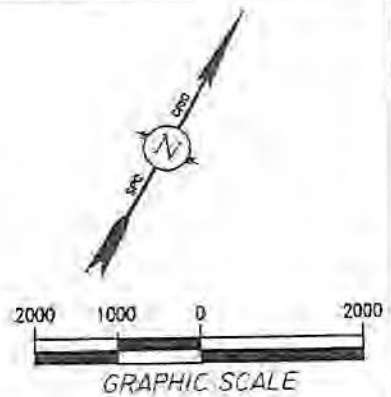
LEGEND

- ⊗ AXLE FOUND
- 5/8" IRON ROD WITH CAP STAMPED "GARRONDONA" SET
- ⊙ IRON PIPE FOUND (SIZE NOTED)
- IRON ROD FOUND (SIZE NOTED)
- ⊠ CONCRETE MONUMENT STAMPED "LCRA" FOUND

D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS  
 O.R.W.C.T. OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS

LINE TABLE		
LINE	BEARING	DISTANCE
L-1	S 31°56'22"E	1628.93'
L-2	S 59°50'29"W	1964.13'
L-3	S 30°18'36"E	1223.14'

CURVE TABLE					
CURVE	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH	ARC LENGTH
C-1	458.00'	52°18'19"	S 55°27'45"E	403.74'	418.11'



NOTE:  
 SEE PAGE 12 FOR EASEMENT NOTES.  
 HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.

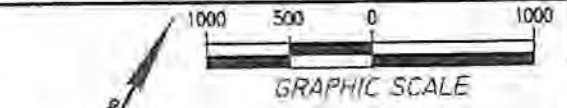
Garrondona & Associates, Inc.  
 4201 W. Parmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78737  
 (512) 719-9933

ACAD FILE: LCRAW114A-0005B.dwg  
 WORD FILE: LCRAW114A-0005B.doc  
 REVISION: 2  
 SCALE: 1"=2000'  
 DATE: 1/17/2013  
 WO NO.: 72165  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

1063.187 ACRES OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 4,  
 ABSTRACT No. 11  
 SYLVANUS CASTLEMAN SURVEY No. 5,  
 ABSTRACT No. 12  
 WHARTON COUNTY, TEXAS

**LCRA**  
 ENERGY-WATER-COMMUNITY SERVICES  
 3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
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WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11  
 SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12



LINE	BEARING	DISTANCE
L-2	S 59°50'29"W	1964.13'
L-3	S 28°01'51"E	58.58'
L-4	S 18°38'44"E	79.27'
L-5	N 89°32'18"E	198.90'
L-6	S 48°32'13"E	149.25'
L-7	S 06°02'26"E	118.89'
L-8	S 07°06'59"E	160.38'
L-9	S 09°20'23"E	135.19'
L-10	S 60°18'44"E	183.95'
L-11	S 60°07'58"E	74.19'
L-12	S 80°34'22"E	141.05'
L-13	S 60°44'04"E	85.28'
L-14	S 39°37'15"E	69.33'
L-15	S 24°02'21"E	118.85'
L-16	S 17°24'47"E	136.99'
L-17	S 10°07'00"E	67.56'
L-18	S 25°03'07"E	106.82'
L-19	S 39°44'27"E	107.71'
L-20	S 16°30'02"E	116.16'
L-21	S 14°20'05"W	77.99'
L-22	S 82°20'02"W	29.00'
L-23	S 27°22'19"W	126.82'
L-24	S 03°56'55"W	153.86'
L-25	S 05°18'16"W	74.70'
L-26	S 06°59'08"E	120.00'
L-27	S 39°23'46"E	67.81'
L-28	N 87°01'53"E	46.12'
L-29	S 58°31'40"E	34.36'
L-30	S 80°36'22"E	135.33'
L-31	S 81°40'23"E	130.28'
L-32	S 75°27'32"E	92.30'
L-33	S 85°57'14"E	77.31'
L-34	N 67°05'20"E	108.75'
L-35	N 65°43'19"E	129.79'
L-36	N 84°57'55"E	44.22'
L-37	S 71°20'36"E	37.18'
L-38	S 31°48'51"E	28.81'
L-39	S 01°09'11"E	44.73'
L-40	S 53°06'12"E	85.79'
L-41	S 00°52'20"E	55.77'
L-42	S 16°28'27"E	109.57'
L-43	S 00°02'45"W	73.15'
L-44	S 00°08'02"E	128.00'
L-45	S 86°53'29"W	47.89'
L-46	S 08°46'18"W	111.53'
L-47	S 28°17'13"E	100.34'

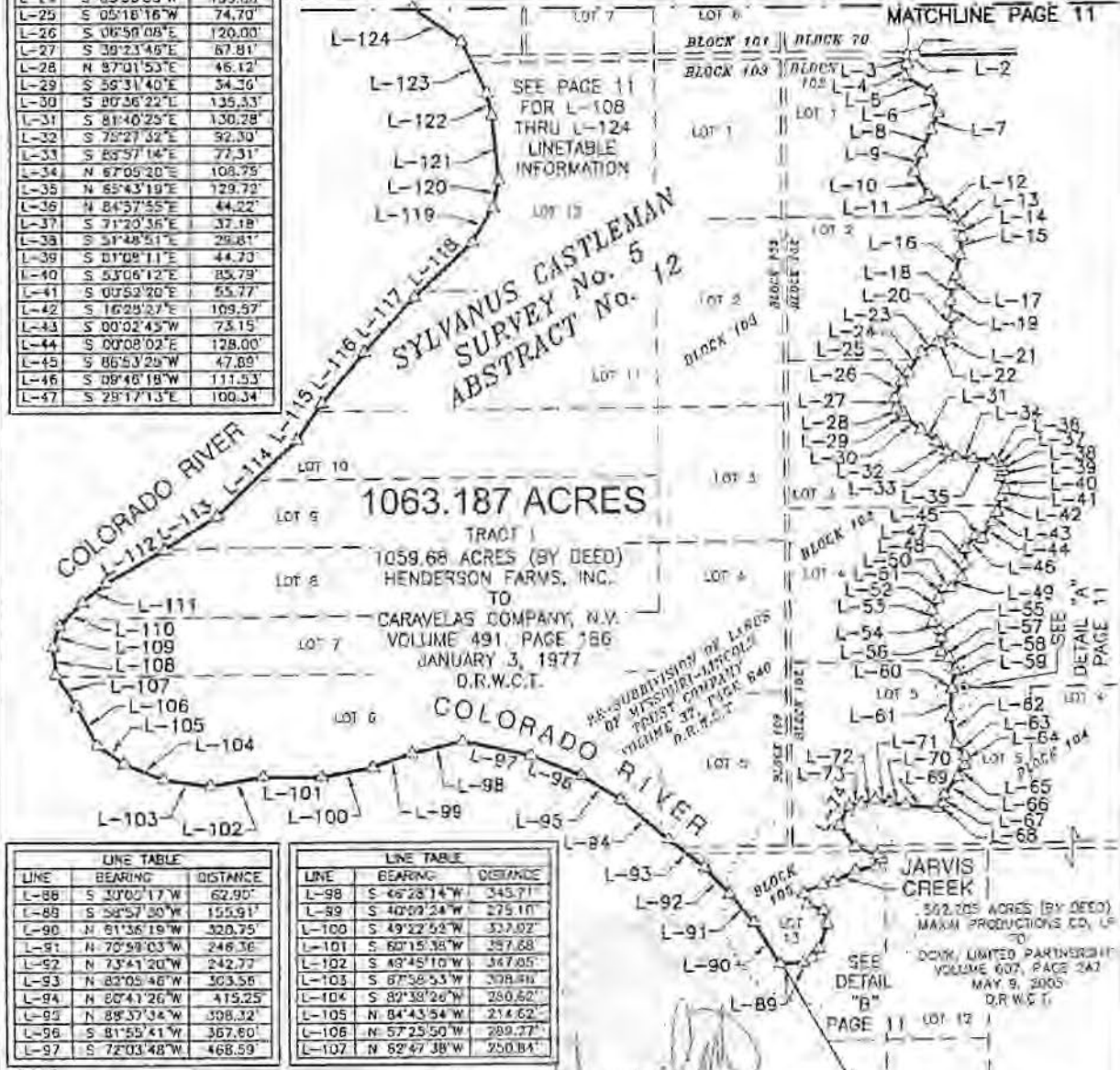
LINE	BEARING	DISTANCE
L-48	S 13°01'03"E	87.58'
L-49	S 14°07'01"W	93.89'
L-50	S 63°51'24"W	46.39'
L-51	S 02°30'20"E	82.42'
L-52	S 01°24'32"W	86.52'
L-53	S 33°38'43"E	77.27'
L-54	S 74°08'20"E	72.88'
L-55	S 40°54'30"E	30.74'
L-56	S 29°00'14"E	94.99'
L-57	S 86°55'06"E	61.34'
L-58	S 57°13'23"E	86.10'
L-59	S 19°37'43"E	122.89'
L-60	S 19°37'43"E	5.29'
L-61	S 27°14'19"E	185.00'
L-62	S 40°47'52"E	183.43'
L-63	S 64°00'40"E	105.85'
L-64	S 24°58'19"E	54.82'
L-65	S 00°18'13"E	94.12'
L-66	S 07°25'32"W	149.60'
L-67	S 25°17'52"E	54.27'
L-68	S 20°12'42"W	51.76'
L-69	S 65°42'02"W	209.64'

**LEGEND**

- 3/8" IRON ROD WITH CAP STAMPED "GORRONDONA" SET
- △ CALCULATED POINT
- D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS
- O.R.W.C.T. OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS

LINE	BEARING	DISTANCE
L-70	S 72°42'01"W	106.43'
L-71	S 70°56'11"W	96.58'
L-72	S 46°17'37"W	97.88'
L-73	S 46°28'53"W	83.63'
L-74	S 02°51'44"E	138.48'
L-75	S 69°29'59"E	176.02'
L-76	N 81°29'13"E	153.63'
L-77	S 78°57'01"E	37.45'
L-78	S 04°32'19"W	60.94'

LINE	BEARING	DISTANCE
L-79	S 48°30'34"W	137.38'
L-80	S 34°33'32"W	159.54'
L-81	S 49°47'05"W	70.20'
L-82	S 34°48'35"W	132.76'
L-83	S 48°14'14"E	79.44'
L-84	N 79°59'35"E	113.63'
L-85	S 46°11'35"E	95.36'
L-86	S 09°22'37"E	168.13'
L-87	S 04°30'02"W	80.21'



LINE	BEARING	DISTANCE
L-88	S 30°00'17"W	62.90'
L-89	S 59°57'30"W	155.91'
L-90	N 61°36'19"W	320.75'
L-91	N 70°59'03"W	246.36'
L-92	N 73°41'20"W	242.77'
L-93	N 83°05'46"W	303.56'
L-94	N 80°41'26"W	415.25'
L-95	N 88°37'34"W	308.32'
L-96	S 81°55'41"W	367.80'
L-97	S 72°03'48"W	468.59'

LINE	BEARING	DISTANCE
L-98	S 46°28'14"W	345.71'
L-99	S 40°09'24"W	275.10'
L-100	S 49°22'53"W	337.02'
L-101	S 60°15'38"W	397.68'
L-102	S 49°45'10"W	347.05'
L-103	S 67°58'53"W	308.86'
L-104	S 82°38'26"W	280.62'
L-105	N 84°43'54"W	214.62'
L-106	N 57°25'50"W	289.77'
L-107	N 62°47'38"W	250.84'

NOTE:  
 SEE PAGE 12 FOR EASEMENT NOTES  
 HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 83  
 COMBINED SCALE FACTOR: 1.00037940  
 BEARING BASE: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN WERE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037940

1/17/2013

Gorrondona & Associates, Inc.  
 4011 W. Parmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 739-0932

ACAD FILE: LCRW114A-0005B.dwg  
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 REVISION: 2  
 SCALE: 1"=1000'  
 DATE: 1/17/2013  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

1063.187 ACRES OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 4,  
 ABSTRACT No. 11  
 SYLVANUS CASTLEMAN SURVEY No. 5,  
 ABSTRACT No. 12  
 WHARTON COUNTY, TEXAS

LCRA  
 ENERGY • WATER • COMMUNITY SERVICES  
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 (512) 473-3200 www.lcra.org



WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11  
 SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12

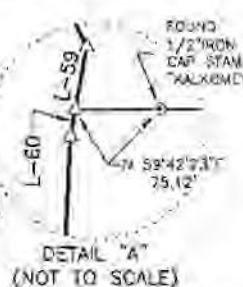
**SYLVANUS CASTLEMAN SURVEY No. 4 ABSTRACT No. 11**

**LEGEND**

- AXLE FOUND
- 3/8" IRON ROD WITH CAP STAMPED "GORRONDONA" SET
- IRON ROD FOUND (SIZE NOTED)
- △ CALCULATED POINT
- CONCRETE MONUMENT STAMPED "LORA" FOUND
- DEED RECORDS OF WHARTON COUNTY, TEXAS OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS

TRACT No. 15  
 5.2 ACRES (BY DEED)  
 GULF COAST RICE FARMS, INC.  
 TO  
 GULF COAST WATER COMPANY  
 VOLUME 249, PAGE 109  
 FEBRUARY 20, 1952  
 D.R.W.C.T.

"LANE CITY SECTION" (BY DEED)  
 GULF COAST WATER COMPANY  
 TO  
 LOWER COLORADO RIVER AUTHORITY  
 VOLUME 313, PAGE 396  
 DECEMBER 30, 1959  
 D.R.W.C.T.



TRACT No. 1  
 REMAINDER OF 75.13 ACRES (BY DEED)  
 GULF COAST RICE FARMS, INC.  
 TO  
 GULF COAST WATER COMPANY  
 VOLUME 249, PAGE 109  
 FEBRUARY 20, 1952  
 D.R.W.C.T.

"LANE CITY SECTION" (BY DEED)  
 GULF COAST WATER COMPANY  
 TO  
 LOWER COLORADO RIVER AUTHORITY  
 VOLUME 313, PAGE 396  
 DECEMBER 30, 1959  
 D.R.W.C.T.

17.9 ACRES (BY DEED)  
 GULF COAST WATER COMPANY  
 TO  
 COUNTY OF WHARTON, TEXAS  
 VOLUME 139, PAGE 608  
 JUNE 28, 1939  
 D.R.W.C.T.

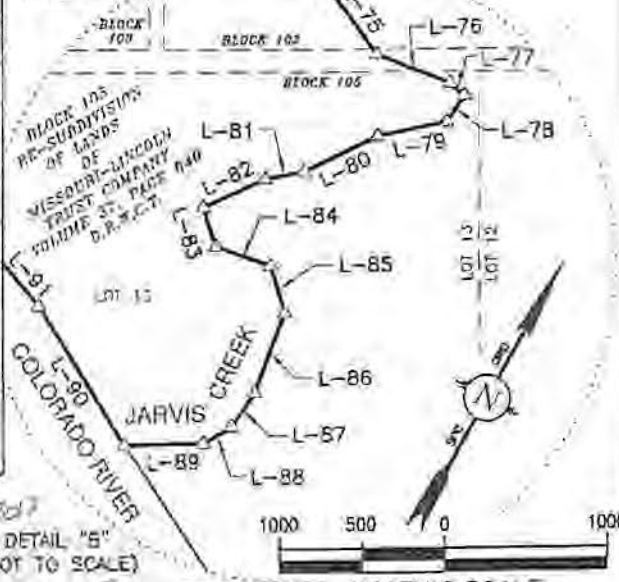
TEXAS CENTRAL ZONE  
 NAD83/NSRS2007  
 STATE PLANE GRID COORDS  
 GRID N: 8,697,617.94 US FT  
 GRID E: 3,862,320.72 US FT  
 FOUND AXES



LINE	BEARING	DISTANCE
L-2	S 59°50'29"W	1964.13'
L-3	S 28°01'51"E	98.58'
L-4	S 18°38'44"E	79.27'
L-58	S 19°37'43"E	122.89'
L-60	S 19°37'43"E	5.29'
L-74	S 02°51'44"E	138.48'
L-75	S 65°29'59"E	178.02'
L-76	N 81°29'13"E	153.93'
L-77	S 78°57'01"E	37.45'
L-78	S 04°32'19"W	60.94'
L-79	S 48°30'34"W	137.38'
L-80	S 34°33'32"W	159.54'
L-81	S 49°47'05"W	76.20'
L-82	S 34°40'35"W	132.76'
L-83	S 48°14'14"E	70.44'
L-84	N 79°59'35"E	113.83'
L-85	S 46°11'35"E	95.36'
L-85	S 09°22'37"E	168.13'
L-87	S 04°30'02"W	80.21'
L-88	S 30°05'17"W	62.90'
L-89	S 58°57'30"W	155.91'
L-90	N 61°36'19"W	320.75'
L-91	N 70°59'03"W	246.36'
L-108	N 29°33'13"W	181.38'
L-109	N 17°25'32"W	145.05'
L-110	N 13°42'22"E	212.46'
L-111	N 21°38'10"E	201.59'
L-112	N 30°26'43"E	435.57'
L-113	N 27°43'01"E	411.83'
L-114	N 15°42'30"E	230.73'
L-115	N 04°29'29"E	289.07'

LINE	BEARING	DISTANCE
L-116	N 10°04'53"E	432.43'
L-117	N 12°54'53"E	485.28'
L-118	N 16°36'51"E	529.37'
L-119	N 00°53'17"E	269.82'
L-120	N 17°53'16"W	183.85'
L-121	N 35°59'28"W	428.15'
L-122	N 43°08'57"W	145.40'
L-123	N 56°23'36"W	377.55'
L-124	N 84°41'17"W	392.71'
L-125	S 85°13'37"W	354.23'
L-126	N 71°24'30"W	722.94'
L-127	N 68°28'45"W	327.58'
L-128	N 57°37'06"W	231.74'
L-129	N 29°08'20"W	210.06'
L-130	N 08°37'31"W	171.38'
L-131	N 16°26'01"W	154.34'
L-132	N 10°44'04"W	160.03'
L-133	N 09°01'37"E	712.00'
L-134	N 27°31'50"W	95.98'
L-135	N 22°42'36"W	43.57'
L-136	S 89°31'24"E	234.75'
L-137	N 00°28'36"E	648.77'
L-138	N 42°41'24"W	445.21'
L-139	N 59°49'36"E	533.69'
L-140	N 38°21'24"W	202.05'

MATCHLINE  
 PAGE 10



NOTE:  
 SEE PAGE 12  
 FOR EASEMENT NOTES.

DETAIL "B"  
 (NOT TO SCALE)

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY FACT OF 1.00037640



**GRAPHIC SCALE**  
 Gorrondona & Associates, Inc.  
 4201 W. Parmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 719-9933

ACAD FILE: LCRW114A-0005B.dwg  
 WORD FILE: LCRW114A-0005B.doc  
 REVISION: 2  
 SCALE: 1"=1000'  
 DATE: 1/17/2013  
 WO NO.: 72166  
 FIELD BOOK: LGRA2  
 DRAWN BY: R. Eckert

1063.187 ACRES OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 4,  
 ABSTRACT No. 11  
 SYLVANUS CASTLEMAN SURVEY No. 5,  
 ABSTRACT No. 12  
 JOHN McCROSKY SURVEY No. 2,  
 ABSTRACT No. 630  
 WHARTON COUNTY, TEXAS

**LCRA**  
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## WHARTON COUNTY, TEXAS

SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11

SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12

ONLY THESE EASEMENTS LISTED IN LIMITED TITLE CERTIFICATE OF No. 2012-0904 DATED AUGUST 31, 2012, BY FIRST AMERICAN TITLE INSURANCE COMPANY WERE EVALUATED FOR THIS SURVEY.  
NO OTHER EASEMENT RECORD RESEARCH WAS PERFORMED BY GORRONDONA & ASSOCIATES INC.

- Thomas Call*  
*1/17/2013*
- d) Easement as shown in instrument from John Norris to Texas Pipeline Company, dated November 4, 1945 and filed in Volume 183, Page 290, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - e) Easement as shown in instrument from John Norris to George K. Tappert, dated March 19, 1946 and filed in Volume 186, Page 57, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - e) Easement as shown in instrument from John Norris to Texas Pipeline Co., dated August 28, 1946 and filed in Volume 188, Page 75, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - f) Easement as shown in instrument from Johnnie Hobbs, et al to Texas Pipeline Company, dated June 30, 1951 and filed in Volume 242, Page 181, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - g) Easement as shown in instrument from J.R. Cox to Texas Central Power Co., dated January 28, 1926 and filed in Volume 73, Page 193, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - h) Easement as shown in instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 276, Page 58, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - i) Easement as shown in instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 282, Page 450, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - j) Easement as shown in instrument from G.W. Townsend to Atlantic Refining Co., dated April 28, 1956 and filed in Volume 299, Page 486, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - k) Easement for electric transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated August 12, 1975 and filed in Volume 458, Page 382, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - l) Easement for electric transmission line as shown in instrument from Lola Ann Hecker to C.P. & L., dated June 16, 1955 and filed in Volume 282, Page 448, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - m) Pipeline easement as shown in instrument from J.B. Gory, Jr., et al to Texas Illinois Natural Gas Pipeline Company, dated August 8, 1950 and filed in Volume 230, Page 315, Deed Records of Wharton County, Texas. (Does affect subject tract, unable to plot exact location)
  - n) Pipeline easement as shown in instrument from J.B. Gory Estate to Humble Pipeline Company, dated December 13, 1951 and filed in Volume 245, Page 245, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, blanket in nature)
  - o) Pipeline easement as shown in instrument from J.B. Gory, Jr., Trustee to Humble Pipeline Co., dated February 13, 1967 and filed in Volume 381, Page 105, Deed Records of Wharton County, Texas. (Does affect subject tract, and shown hereon)
  - p) Pipeline easement as shown in instrument from Annie E. Taylor to Atlantic Oil Production Co., dated January 11, 1926 and filed in Volume 71, Page 385, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, blanket in nature)
  - q) Pipeline easement as shown in instrument from Annie E. Taylor to Atlantic Production Co., dated January 26, 1926 and filed in Volume 71, Page 490, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, blanket in nature)
  - r) Pipeline easement as shown in instrument from Annie E. Taylor to Shamrock Texas Pipeline Co., dated April 19, 1926 and filed in Volume 73, Page 462, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, blanket in nature)
  - s) Pipeline easement as shown in instrument from Annie E. Taylor to Humble Pipeline Co., dated March 21, 1926 and filed in Volume 74, Page 617, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, blanket in nature)
  - t) Easement for electrical transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated February 17, 1972 and filed in Volume 423, Page 409, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - u) Easement for electrical transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, Page 409, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - v) 10 ft. wide easement for electrical line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, Page 408, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - w) Easement for electric transmission line as shown in instrument from Ada Houston Cox to C.P. & L., dated May 12, 1955 and filed in Volume 284, Page 276, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - x) Easement for pipeline as shown in instrument from Ada Houston Cox to Shell Petroleum Co., dated June 30, 1954 and filed in Volume 270, Page 565, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - y) Easement for electric transmission line as shown in instrument from J.R. Cox to Houston Lighting & Power Co., dated March 29, 1926 and filed in Volume 74, Page 222, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - z) Easement for electric transmission line as shown in instrument from Ada H. Cox to H.L. & P., dated March 2, 1961 and filed in Volume 347, Page 207, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - aa) Easement for electric transmission line as shown in instrument from T. Gordon, et al to Houston Lighting & Power Co., dated January 12, 1951 and filed in Volume 327, Page 556, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - bb) 22 ft. wide easement for road along Northwest line of subject property as shown by Plat of said Subdivision, filed in Volume 37, Page 540, Deed Records of Wharton County, Texas. (Does not affect subject tract)

HORIZONTAL DATUM: NAD83/NSRS2007  
VERTICAL DATUM: NAVD 88  
COMBINED SCALE FACTOR: 1.00037640  
BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640



Gorrondona & Associates, Inc.  
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DRAWN BY: R. Eckert

1063.187 ACRES OUT OF  
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SYLVANUS CASTLEMAN SURVEY No. 5,  
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WHARTON COUNTY, TEXAS

**LCRA**  
ENERGY • WATER • COMMUNITY SERVICES  
3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
(512) 473-3200 www.lcra.org

EXHIBIT " B "

**BEING A 379.090 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12, JOHN McCROSKY SURVEY No 2, ABSTRACT No. 630, AND GULF, WESTERN TEXAS & PACIFIC RAILWAY COMPANY SURVEY No. 1, ABSTRACT No. 625, ALL IN WHARTON COUNTY, TEXAS, SAID 379.090 ACRE TRACT OF LAND BEING A PORTION OF BLOCK 48 AND BLOCK 69, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 379.090 ACRE TRACT OF LAND BEING ALL OF TRACT III, A 379.68 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM HENDERSON FARMS, INC. TO CARAVELAS COMPANY, N.V., EXECUTED JANUARY 3, 1977, RECORDED IN VOLUME 491, PAGE 186, D.R.W.C.T., SAID 379.090 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:**

**BEGINNING** at a 1-1/4 inch iron pipe found (Grid Coordinates N=9,694,960.06 US Feet, E=3,666,510.05 US Feet) for the southwest corner of said Tract III and for the northwest corner of First Tract, a 163.299 acre tract of land (by deed), described in deed from Oldrich J. Hlavinka and wife, Bessie Hlavinka to James J. Hlavinka and wife, Annette J. Hlavinka, executed August 23, 1977, recorded in Volume 486, Page 267, D.R.W.C.T., said 1-1/4 inch iron pipe being in the east line of a 188.90 acre tract of land (by deed), described in deed from John W. Williams and Kimberly J. Williams to Greg A. Koenig and Ronald C. Koenig, executed February 19, 2008, recorded in Volume 733, Page 743, O.R.W.C.T. and being in the east line of Block 71 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, said 1-1/4 inch iron pipe being the southwest corner of said Block 69 and also being the northwest corner of Block 68 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company;

**THENCE** North 30 degrees 16 minutes 31 seconds West, with the west line of said Tract III, with the east line of said 188.90 acre tract of land, with the west line of said Block 69, and with the east line of said Block 71, passing at a distance of 2743.74 feet a 5/8 inch iron rod with cap stamped "5319" found for reference, in all, a distance of 2772.97 feet to a calculated point for the northwest corner of said Tract III and for the northeast corner of said 188.90 acre tract of land, said calculated point being in the south line of a 277.33 acre tract of land (by deed), described in deed from F. D. Gavranovic to F. D. Gavranovic, Jr., executed October 29, 1997, recorded in Volume 255, Page 813 of the Official Records of Wharton County, Texas, (O.R.W.C.T.) and being in the approximate centerline of a 44 foot wide road dedication as shown on said Re-Subdivision of lands of Missouri-Lincoln Trust Company plat, currently known as County Road No. 116 (a/k/a Henry Road), said calculated point also being the common corner of said Block 69, said Block 71, Block 70 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, and Block 47 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, from which a 3/4 inch iron pipe found bears, North 30 degrees 16 minutes 31 seconds West, a distance of 0.75 feet;

**THENCE** North 59 degrees 50 minutes 29 seconds East, with the north line of said Tract III, with the south line of said 277.33 acre tract of land, with the north line of said Block 69, with the south line of said Block 47, with the north line of said Block 48, with the south line of Block 38 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, and with the approximate centerline of said 44 foot wide road currently known as County Road No. 116, passing the easterly line of said Sylvanus Castleman Survey No. 5 and the westerly line of said John McCrosky Survey No. 2, in all, a distance of 5667.22 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the northeast corner of said Tract III and for the southeast corner of said 277.33 acre tract of land, said 5/8 inch iron rod with cap stamped "GORRONDONA" also being in a westerly line of Tract No. 2, a 129.3 acre tract of land (by deed), described in deed from Gulf Coast Rice Farms, Inc. to Gulf Coast Water Company, executed February 20, 1952, recorded in Volume 249, Page 109, D.R.W.C.T. and also being in a westerly line of "Lane City Section" (by deed), described in deed from Gulf Coast Water Company to Lower Colorado River Authority, executed December 31, 1959, recorded in Volume 318, Page 396, D.R.W.C.T., from which a concrete monument with disc stamped "LCRA SURVEY MARK" found bears, North 40 degrees 57 minutes 08 seconds West, a distance of 30.70 feet;

**THENCE** South 42 degrees 10 minutes 59 seconds East, with an east line of said Tract III and with a westerly line of said 129.3 acre tract of land, a distance of 2168.28 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

**THENCE** South 30 degrees 31 minutes 49 seconds East, with an east line of said Tract III and with a westerly line of said 129.3 acre tract of land, a distance of 662.40 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the southeast corner of said Tract III and for the northeast corner of said First Tract, said 5/8 inch iron rod with cap stamped "GORRONDONA" being in the south line of said Block 48 and also being in the north line of Block 49 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company;

Wharton County, Texas  
Sylvanus Castleman Survey No. 5, Abstract No. 12  
John McCrosky Survey No. 2, Abstract No. 630  
Gulf, Western Texas & Pacific Railway Company Survey No. 1  
Abstract No. 625  
Lower Colorado River Authority

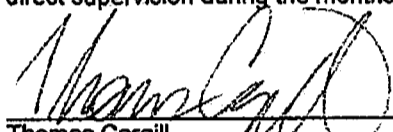
379.090 Acres  
Page 2 of 4

**THENCE** South 59 degrees 56 minutes 11 seconds West, with the south line of said Tract III, with the north line of said First Tract, with the south line of said Block 48, and with the north line of said Block 49, passing at a distance of 1166.61 feet, a 2 inch iron pipe (damaged) found for reference, continuing with the south line of said Tract III, the north line of said First Tract, the south line of said Block 48, the north line of said Block 49, with the south line of said Block 69, and with the north line of said Block 68, passing the west line of said Gulf, Western Texas & Pacific Railway Company Survey No. 1 and the east line of said Sylvanus Castleman Survey No. 5, in all, a distance of 6117.60 feet to the **POINT OF BEGINNING**, and containing 379.090 acres of land, more or less.

Bearing Basis: Texas Lambert Grid, Central Zone, NAD83/NSRS2007.

All distances are surface values and in U. S. Survey Feet. To compute grid values multiply surface distances by a Combined Scale Factor of 1.00037640.

The field notes and the plat attached hereto represent an on-the-ground survey made under my direct supervision during the months of September 2012 to October 2012.

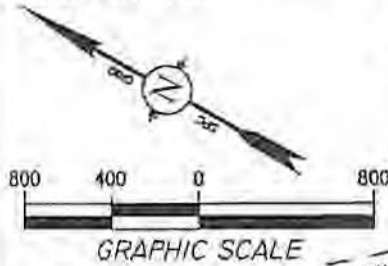
  
\_\_\_\_\_  
Thomas Cargill  
Registered Professional Land Surveyor No. 5835  
Gorrondona and Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933

Word File: LCRAW114A-0003A.DOC  
Drawing File: LCRAW114A-0003A.DWG



WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12  
 JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630  
 GULF, WESTERN TEXAS & PACIFIC RAILWAY COMPANY SURVEY No. 1,  
 ABSTRACT No. 625

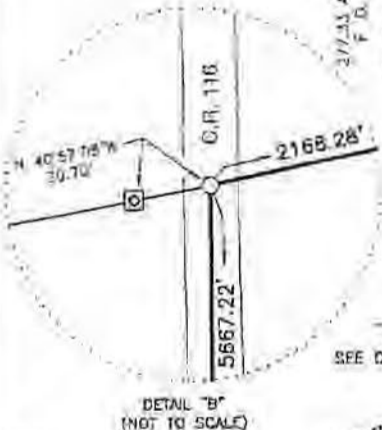
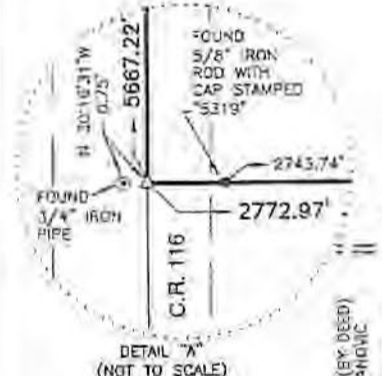
LINE TABLE		
LINE	BEARING	DISTANCE
L-1	S 30°31'49"E	662.40'



TRACT No. 2 - 129.3 ACRES (BY DEED)  
 GULF COAST RICE FARMS, INC.  
 TO  
 GULF COAST WATER COMPANY  
 VOLUME 249, PAGE 109, D.R.W.C.T.  
 FEBRUARY 23, 1932  
 LANE CITY SECTION (BY DEED)  
 GULF COAST WATER COMPANY  
 TO  
 LOWER COLORADO RIVER AUTHORITY  
 VOLUME 318, PAGE 396, D.R.W.C.T.  
 DECEMBER 31, 1959

*Handwritten signature and date: 1/16/2013*

- LEGEND**
- △ CALCULATED POINT
  - ⊙ IRON PIPE FOUND (SIZE NOTED)
  - IRON ROD FOUND (SIZE NOTED)
  - 5/8" IRON ROD WITH CAP STAMPED "GORRONDONA" SET
- D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS  
 O.R.W.C.T. OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS



NOTE: SEE PAGE 4 FOR EASEMENT NOTES.

HORIZONTAL DATUM: NAD83/NRS2007  
 VERTICAL DATUM: NAVD 83  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY 0.99962360



**379.090 ACRES**  
 INCLUDING APPROXIMATELY 2.9 ACRES  
 IN COUNTY ROAD No. 116  
 TRACT III  
 379.68 ACRES (BY DEED)  
 HENDERSON FARMS, INC.  
 TO  
 CARAVELAS COMPANY, N.V.  
 VOLUME 491, PAGE 186  
 JANUARY 3, 1977  
 D.R.W.C.T.

**P.O.B.  
 379.090 ACRES**

ACAD FILE: LCRAW114A-0003A.dwg  
 WORD FILE: LCRAW114A-0003A.doc  
 REVISION: N/A  
 SCALE: 1"=800'  
 DATE: 1/16/2013  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

379.090 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 5  
 ABSTRACT No. 12  
 JOHN McCROSKY SURVEY No. 2  
 ABSTRACT No. 630 AND  
 GULF, WESTERN TEXAS & PACIFIC  
 RAILWAY COMPANY SURVEY No. 1  
 ABSTRACT No. 625  
 WHARTON COUNTY, TEXAS

**Gorronдона & Associates, Inc.**  
 1201 W. Farmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 719-9933





WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12  
 JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 530

ONLY THESE EASEMENTS LISTED IN LIMITED TITLE CERTIFICATE OF No. 2012-0904  
 DATED AUGUST 31, 2012, BY FIRST AMERICAN TITLE INSURANCE COMPANY WERE EVALUATED  
 FOR THIS SURVEY.  
 NO OTHER EASEMENT RECORD RESEARCH WAS PERFORMED BY GORRONDONA & ASSOCIATES INC.

- Handwritten signature and date: 1/16/2013*
- c) Easement as shown in instrument from John Norris to Texas Pipeline Company, dated November 4, 1945 and filed in Volume 183, Page 290, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - d) Easement as shown in instrument from John Norris to George K. Taggart, dated March 19, 1946 and filed in Volume 186, Page 57, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - e) Easement as shown in instrument from John Norris to Texas Pipeline Co., dated August 28, 1946 and filed in Volume 188, Page 75, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - f) Easement as shown in instrument from Johnnie Hobbs, et al to Texas Pipeline Company, dated June 30, 1951 and filed in Volume 242, Page 181, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - g) Easement as shown in instrument from J.R. Cox to Texas Central Power Co., dated January 28, 1926 and filed in Volume 73, Page 193, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - h) Easement as shown in instrument from G.W. Townsend to Central Power & Light Co. filed in Volume 276, Page 56, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - i) Easement as shown in instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 282, Page 490, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - j) Easement as shown in instrument from G.W. Townsend to Atlantic Refining Co., dated April 28, 1956 and filed in Volume 289, Page 486, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - k) Easement for electric transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated August 12, 1975 and filed in Volume 458, Page 382, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - l) Easement for electric transmission line as shown in instrument from Lois Ann Hecker to C.P. & L., dated June 16, 1958 and filed in Volume 282, Page 448, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - m) Pipeline easement as shown in instrument from J.B. Gary, Jr., et al to Texas Illinois Natural Gas Pipeline Company, dated August 8, 1950 and filed in Volume 230, Page 315, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - n) Pipeline easement as shown in instrument from J.B. Gary Estate to Humble Pipeline Company, dated December 13, 1951 and filed in Volume 245, Page 243, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - o) Pipeline easement as shown in instrument from J.B. Gary, Jr., Trustee to Humble Pipeline Co., dated February 13, 1967 and filed in Volume 381, Page 105, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - p) Pipeline easement as shown in instrument from Annie E. Taylor to Atlantic Oil Production Co., dated January 11, 1926 and filed in Volume 71, Page 388, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - q) Pipeline easement as shown in instrument from Annie E. Taylor to Atlantic Production Co., dated January 26, 1926 and filed in Volume 71, Page 490, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - r) Pipeline easement as shown in instrument from Annie E. Taylor to Sinclair Texas Pipeline Co., dated April 19, 1926 and filed in Volume 73, Page 462, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - s) Pipeline easement as shown in instrument from Annie E. Taylor to Humble Pipeline Co., dated March 21, 1926 and filed in Volume 74, Page 617, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - t) Easement for electrical transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated February 17, 1972 and filed in Volume 423, Page 409, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - u) Easement for electrical transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, Page 409, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - v) 10 ft. wide easement for electrical line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, Page 468, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - w) Easement for electric transmission line as shown in instrument from Ada Houston Cox to C.P. & L., dated May 12, 1958 and filed in Volume 284, Page 278, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - x) Easement for pipeline as shown in instrument from Ada Houston Cox to Sabco Petroleum Co., dated June 30, 1954 and filed in Volume 270, Page 565, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - y) Easement for electric transmission line as shown in instrument from J.R. Cox to Houston Lighting & Power Co., dated March 29, 1926 and filed in Volume 74, Page 222, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - z) Easement for electric transmission line as shown in instrument from Ada H. Cox to H.L. & P., dated March 2, 1961 and filed in Volume 347, Page 207, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - ca) Easement for electric transmission line as shown in instrument from T. Gordon, et al to Houston Lighting & Power Co., dated January 12, 1961 and filed in Volume 327, Page 358, Deed Records of Wharton County, Texas. (Does affect subject tract and is shown hereon)
  - cb) 22 ft. wide easement for road along Northwest line of subject property as shown by Plat of said Subdivision, filed in Volume 37, Page 640, Deed Records of Wharton County, Texas. (Does not affect subject tract)

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY 0.99962360



Gorrondona & Associates, Inc.  
 4201 W. Farmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 719-9933

ACAD FILE: LCRW114A-0003A.dwg  
 WORD FILE: LCRW114A-0003A.doc  
 REVISION: N/A  
 SCALE: 1"=800'  
 DATE: 1/16/2013  
 WO NO.: 72166  
 FIELD BOOK: LCR2  
 DRAWN BY: R. Eckert

379.090 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 5  
 ABSTRACT No. 12  
 JOHN McCROSKY SURVEY No. 2  
 ABSTRACT No. 630 AND  
 GULF, WESTERN TEXAS & PACIFIC  
 RAILWAY COMPANY SURVEY No. 1  
 ABSTRACT No. 625  
 WHARTON COUNTY, TEXAS

**LCRA**  
 ENERGY • WATER • COMMUNITY SERVICES  
 3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
 (512) 473-3200 www.lcra.org

EXHIBIT "C"

BEING A 189.492 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11, D. DAVIS & D. BAKER SURVEY, ABSTRACT No. 71, AND JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630, ALL IN WHARTON COUNTY, TEXAS, SAID 189.492 ACRE TRACT OF LAND BEING A PORTION OF BLOCK 38 AND BLOCK 39, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 189.492 ACRE TRACT OF LAND BEING ALL OF TRACT II, A 189.51 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM HENDERSON FARMS, INC., TO CARAVELAS COMPANY, N.V., EXECUTED JANUARY 3, 1977, RECORDED IN VOLUME 491, PAGE 186, D.R.W.C.T., SAID 189.492 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

**BEGINNING** at a 3/4 inch iron pipe found (Grid Coordinates N=9,701,393.35 US Feet, E=3,665,712.17 US Feet) for the northwest corner of said Tract II, being in the southeast line of a 17.9 acre tract of land (by deed), described in deed from Gulf Coast Water Company to County of Wharton, Texas, executed June 28, 1939, recorded in Volume 139, Page 608, D.R.W.C.T., said 3/4 inch iron pipe being in the east line of Tract No. 2, a 129.3 acre tract of land (by deed), described in deed from Gulf Coast Rice Farms, Inc. to Gulf Coast Water Company, executed February 20, 1952, recorded in Volume 249, Page 109, D.R.W.C.T. and also being in the east line of "Lane City Section" (by deed), described in deed from Gulf Coast Water Company to Lower Colorado River Authority, executed December 31, 1959, recorded in Volume 318, Page 396, D.R.W.C.T.;

**THENCE** North 59 degrees 38 minutes 52 seconds East, with the northwest line of said Tract II and with the southeast line of said 17.9 acre tract of land, passing the east line of said Sylvanus Castleman Survey No. 4 and the west line of said D. Davis & D. Baker Survey, in all, a distance of 5300.00 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the northeast corner of said Tract II, in the curving westerly right-of-way line of State Highway No. 60 (100 foot wide right-of-way);

**THENCE**, with a northeast line of said Tract II and with the southwest right-of-way line of State Highway No. 60, along a curve to the left, an arc length of 808.05 feet, having a radius of 5779.58 feet, a central angle of 8 degrees 00 minutes 38 seconds, and whose chord bears, South 26 degrees 14 minutes 20 seconds East, a distance of 807.39 feet, to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for point of tangency in the northeast line of said Tract II and a point of tangency in the southwest right-of-way line of State Highway No. 60;

**THENCE** South 30 degrees 14 minutes 39 seconds East, with a northeast line of said Tract II and with the southwest right-of-way line of State Highway No. 60, passing the southeast line of said Block 39 and the northwest line of said Block 38, in all, a distance of 870.18 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the southeast corner of said Tract II and for the northeast corner of a 75.42 acre tract of land (by deed), described in deed from Dorothy Mae Wishart Ziober, Peggy Jo Jones, Carol Jean Wootton, Gregory Lynn Ziober, Kenneth Max Ziober, Susan Kay Olday, Nancy Carol Johnson, Donald Mark Meek, David R. Meek, Marion Ziober, Beverly Backstrom, Mary Clark, Alvin Frank Ziober, John David Ziober, Jane Ann Ziober Schnieder, Joe D. King, Frank John Ziober, Lucille Helen Ziober Jurek, and Betty Jean Ziober Shoppa to F. Daniel Gavranovic, and spouse, Gladys R. Gavranovic; F. D. Gavranovic and spouse, Meta Gavranovic, executed April 4, 2012, recorded in Volume 883, Page 850 of the Official Records of Wharton County, Texas (O.R.W.C.T.);

**THENCE** South 60 degrees 09 minutes 38 seconds West, with a southeast line of said Tract II and with a northwest line of said 75.42 acre tract of land, a distance of 573.01 feet to a 5/8 inch iron rod with cap stamped "5319" found for an exterior ell corner of said Tract II and for an interior ell corner of said 75.42 acre tract of land;

**THENCE** North 61 degrees 57 minutes 52 seconds West, with an interior line of said Tract II and with an interior line of said 75.42 acre tract of land, a distance of 74.50 feet to a 1/2 inch iron rod found for an interior ell corner of said Tract II and for an exterior ell corner of said 75.42 acre tract of land;

**THENCE** South 59 degrees 32 minutes 08 seconds West, with a southeast line of said Tract II and with a northwest line of said 75.42 acre tract of land, passing the westerly line of said D. Davis & D. Baker Survey and the easterly line of said John McCrosky Survey No. 2, in all, a distance of 1801.22 feet to a 5/8 inch iron rod with cap stamped "5319" found for an exterior ell corner of said Tract II and for the northwest corner of said 75.42 acre tract of land, said 5/8 inch iron rod with cap stamped "5319" being in a northerly line of said 129.3 acre tract of land and also being in a northerly line of said "Lane City Section";

**THENCE**, with the curving southeast line of said Tract II, with the curving northerly line of said 129.3 acre tract of land, and with the curving northerly line of said "Lane City Section", along a curve to the left, an arc length of 272.85 feet, having a radius of 458.00 feet, a central angle of 34 degrees 07 minutes 59 seconds, and whose chord bears, South 76 degrees 43 minutes 23 seconds West, a distance of 268.83 feet to a concrete monument with disc stamped "LCRA SURVEY MARK" found for the point of tangency of a southeast line of said Tract II and for the point of tangency of a northerly line of said 129.3 acre tract of land, said concrete monument with disc stamped "LCRA SURVEY MARK" also being a point of tangency of a northerly line of said "Lane City Section";

**THENCE** South 59 degrees 39 minutes 24 seconds West, with a southeast line of said Tract II, with a northerly line of said 129.3 acre tract of land, and with a northerly line of said "Lane City Section", a distance of 2263.17 feet to a calculated point in water for the southerly southwest corner of said Tract II and for an interior corner of said 129.3 acre tract of land, said calculated point in water also being an interior corner of said "Lane City Section";

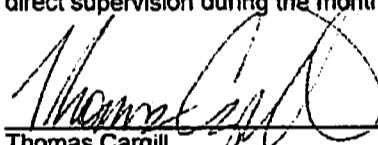
**THENCE**, with a southwest line of said Tract II, with an interior line of said 129.3 acre tract of land, and with an interior line of said "Lane City Section", passing the northwest line of said Block 38 and the southeast line of said Block 39, along a curve to the right, an arc length of 483.98 feet, having a radius of 308.00 feet, a central angle of 90 degrees 02 minutes 00 seconds, and whose chord bears, North 75 degrees 19 minutes 36 seconds West, a distance of 435.70 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the westerly southwest corner of said Tract II and for an interior corner of said 129.3 acre tract of land, said 5/8 inch iron rod with cap stamped "GORRONDONA" also being an interior corner of said "Lane City Section";

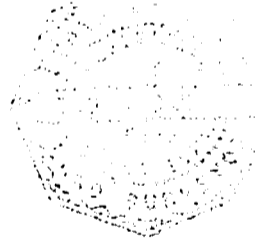
**THENCE** North 30 degrees 18 minutes 36 seconds West, with a southwest line of said Tract II, with an easterly line of said 129.3 acre tract of land, and with an easterly line of said "Lane City Section", passing the north line of said John McCrosky Survey No. 2 and the south line of said Sylvanus Castleman Survey No. 4, in all, a distance of 1222.95 feet to the **POINT OF BEGINNING**, and containing 189.492 acres of land, more or less.

Bearing Basis: Texas Lambert Grid, Central Zone, NAD83/NSRS2007.

All distances are surface values and in U. S. Survey Feet. To compute grid values multiply surface distances by a Combined Scale Factor of 1.00037640.

The field notes and the plat attached hereto represent an on-the-ground survey made under my direct supervision during the months of September 2012 to November 2012.

  
\_\_\_\_\_  
Thomas Cargill  
Registered Professional Land Surveyor No. 5835  
Gorrondona and Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933

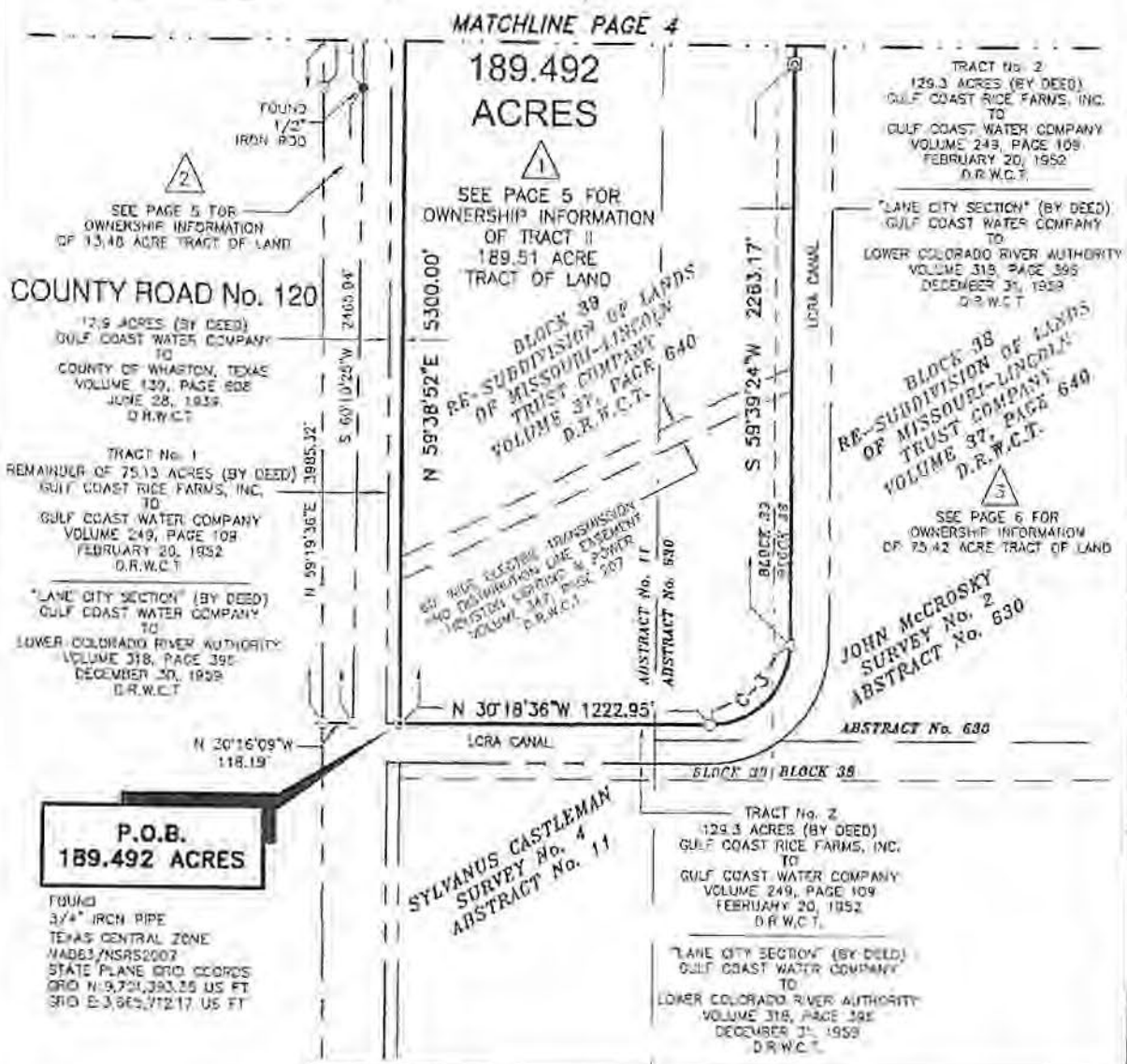
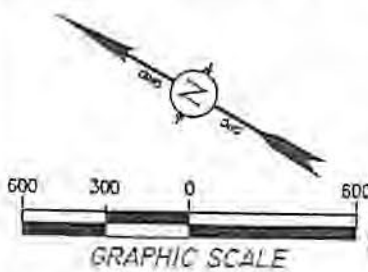


Word File: LCRAW114A-0001A.DOC  
Drawing File: LCRAW114A-0001A.DWG

WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11  
 D. DAVIS & D. BAKER SURVEY, ABSTRACT No. 71  
 JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630

LEGEND

- △ CALCULATED POINT
  - ⊠ CORAL CONCRETE MONUMENT FOUND
  - IRON ROD WITH CAP STAMPED "CLARK SURVEYING 1881" FOUND
  - ⊙ IRON PIPE FOUND (SIZE NOTED)
  - IRON ROD FOUND (SIZE NOTED)
  - 5/8" IRON ROD WITH CAP STAMPED "GORRONDONA" SET
- D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS  
 O.R.W.C.T. OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS



**P.O.B. 189.492 ACRES**

FOUND 3/4" IRON PIPE  
 TEXAS CENTRAL ZONE  
 NAD83/NSRS2007  
 STATE PLANE GRID COORDS  
 GRID N: 9,721,393.25 US FT  
 GRID E: 3,652,112.17 US FT

CURVE TABLE						
CURVE	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH	ARC LENGTH	
C-3	308.00'	90°02'00"	N 75°19'36"W	435.70'	483.98'	

NOTES:  
 1) SEE PAGE 5 FOR OWNERSHIP INFORMATION.  
 2) SEE PAGE 6 FOR EASEMENT NOTES.

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00057640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPLETE GRID DISTANCE MULTIPLY BY CSF OF 1.00057640



Gorrondone & Associates, Inc.  
 4301 W. Plumer Lane, Bldg. B, Suite 300  
 Austin, Texas 78727  
 (512) 719-8938

ACAD FILE: LCRAW114A-0001A.dwg  
 WORD FILE: LCRAW114A-0001A.doc  
 REVISION: 1  
 SCALE: 1"=600'  
 DATE: 1/15/2013  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

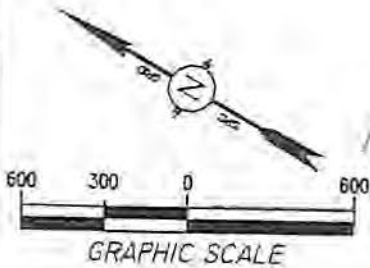
189.492 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 4  
 ABSTRACT No. 11  
 D. DAVIS & D. BAKER SURVEY  
 ABSTRACT No. 71  
 AND JOHN McCROSKY SURVEY No. 2  
 ABSTRACT No. 630  
 WHARTON COUNTY, TEXAS



WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11  
 D. DAVIS & D. BAKER SURVEY, ABSTRACT No. 71  
 JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630

LEGEND

- △ CALCULATED POINT
  - ⊙ IRON ROD WITH CAP
  - ⊙ STAMPED "CLARK SURVEYING 1887" FOUND
  - ⊙ IRON PIPE FOUND (SIZE NOTES)
  - ⊙ IRON ROD FOUND (SIZE NOTES)
  - ⊙ 5/8" IRON ROD WITH CAP STAMPED "CORRONDONA" SET
- D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS.

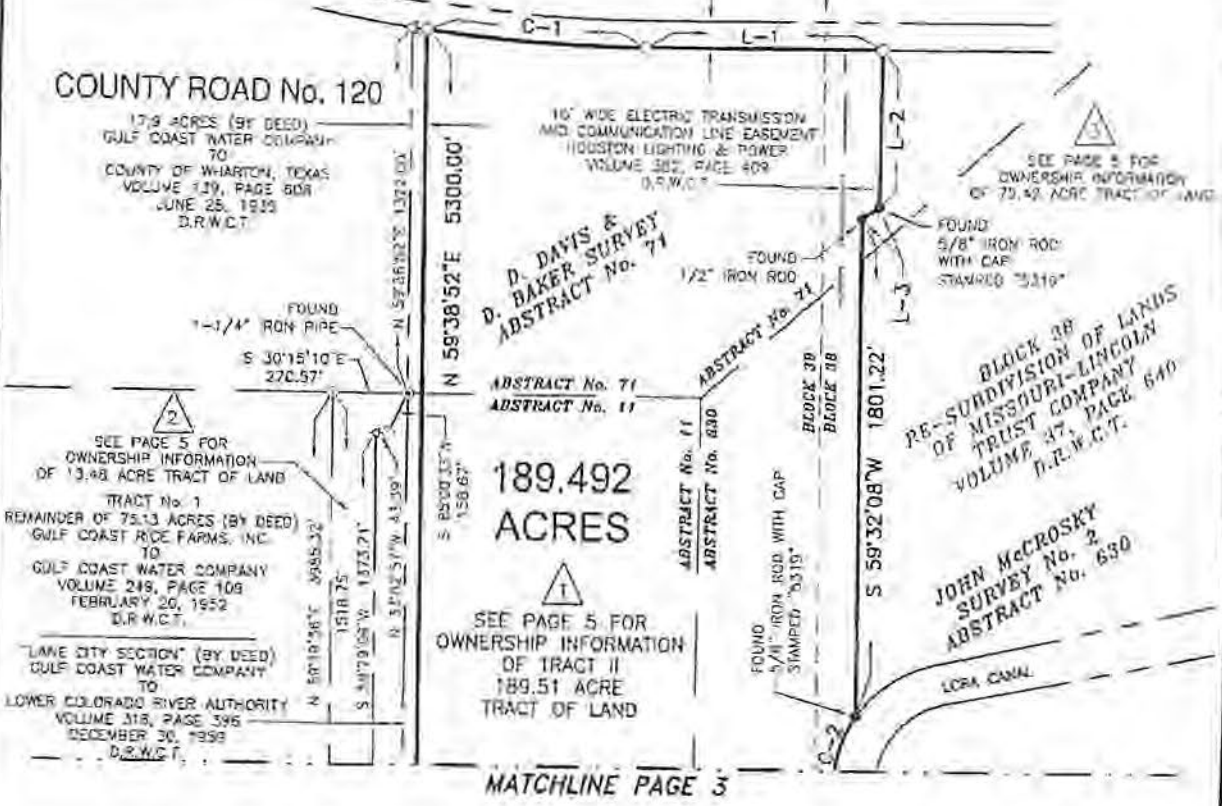


*[Handwritten Signature]*  
 1/15/2013

CURVE TABLE					
CURVE	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH	ARC LENGTH
C-1	5779.58'	8°00'38"	S 26°14'20"E	807.39'	808.05'
C-2	458.00'	34°07'59"	S 76°43'23"W	268.83'	272.85'

LINE TABLE		
LINE	BEARING	DISTANCE
L-1	S 30°14'39"E	870.18'
L-2	S 60°09'38"W	573.01'
L-3	N 61°57'52"W	74.50'

STATE HIGHWAY No. 60  
 (100' WIDE RIGHT-OF-WAY)



- NOTES:
- 1) SEE PAGE 6 FOR OWNERSHIP INFORMATION,
  - 2) SEE PAGE 6 FOR EASEMENT NOTES.

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00017840.



Gorrondona & Associates, Inc.  
 4201 W. Parmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 719-9933

ACAD FILE: LCRW114A-0001A.dwg  
 WORD FILE: LCRW114A-0001A.doc  
 REVISION: 1  
 SCALE: 1"=600'  
 DATE: 1/15/2013  
 WD NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

189.492 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 4  
 ABSTRACT No. 11  
 D. DAVIS & D. BAKER SURVEY  
 ABSTRACT No. 71  
 AND JOHN McCROSKY SURVEY No. 2  
 ABSTRACT No. 630  
 WHARTON COUNTY, TEXAS



WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11  
 D. DAVIS & D. BAKER SURVEY, ABSTRACT No. 71  
 JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630

LEGEND

D.R.W.C.T DEED RECORDS OF WHARTON COUNTY, TEXAS  
 O.R.W.C.T OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS

*Handwritten signature*  
 1/15/2013

1

TRACT II  
 189.51 ACRES (BY DEED)  
 HENDERSON FARMS, INC.  
 TO  
 CARAVELAS COMPANY, N.V.  
 VOLUME 491, PAGE 186  
 JANUARY 3, 1977  
 D.R.W.C.T.

2

TRACT II  
 13.48 ACRES (BY DEED)  
 VIVYEN BEARD NELSON FAMILY LIMITED PARTNERSHIP, ACTING BY AND  
 THROUGH RICHARD CHARLES GEISLER, SR., SOLE SURVIVING GENERAL PARTNER  
 TO  
 F. D. GAVRANOVIC AND META GAVRANOVIC, HUSBAND AND WIFE AND DANIEL GAVRANOVIC AND  
 GLADYS GAVRANOVIC, HUSBAND AND WIFE  
 VOLUME 791, PAGE 312  
 AUGUST 12, 2009  
 O.R.W.C.T.

3

75.42 ACRES (BY DEED)  
 DOROTHY MAE WISHERT ZIOBER, PEGGY JO JONES, CAROL JEAN WOOTTON,  
 GREGORY LYNN ZIOBER, KENNETH MAX ZIOBER, SUSAN KAY OLDAY,  
 NANCY CAROL JOHNSON, DONALD MARK MEEK, DAVID R. MEEK,  
 MARION ZIOBER, BEVERLY BACKSTROM, MARY CLARK, ALVIN FRANK ZIOBER,  
 JOHN DAVID ZIOBER, JANE ANN ZIOBER SCHNIEDER, JOE D. KING,  
 FRANK JOHN ZIOBER, LUCILLE HELEN ZIOBER JUREK,  
 AND BETTY JEAN ZIOBER SHOPPA  
 TO  
 F. DANIEL GAVRANOVIC, AND SPOUSE, GLADYS R. GAVRANOVIC;  
 F. D. GAVRANOVIC, AND SPOUSE META GAVRANOVIC  
 VOLUME 883, PAGE 050  
 APRIL 4, 2012  
 O.R.W.C.T.

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.



Gorrondona & Associates, Inc.  
 4201 W. Farmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 719-4933

ACAD FILE: LCRRAW114A-0001A.dwg  
 WORD FILE: LCRRAW114A-0001A.doc  
 REVISION: 1  
 SCALE: 1"=600'  
 DATE: 1/15/2013  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

189.492 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 4  
 ABSTRACT No. 11  
 D. DAVIS & D. BAKER SURVEY  
 ABSTRACT No. 71  
 AND JOHN McCROSKY SURVEY No. 2  
 ABSTRACT No. 630  
 WHARTON COUNTY, TEXAS

**LCRA**  
 ENERGY • WATER • COMMUNITY SERVICES  
 3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
 (512) 473-3200 www.lcra.org

WHARTON COUNTY, TEXAS  
SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11  
D. DAVIS & D. BAKER SURVEY, ABSTRACT No. 71  
JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630

*Thomas G. [Signature]*  
1/15/2013

ONLY THESE EASEMENTS LISTED IN LIMITED TITLE CERTIFICATE OF No. 2012-0904  
DATED AUGUST 31, 2012, BY FIRST AMERICAN TITLE INSURANCE COMPANY WERE EVALUATED  
FOR THIS SURVEY.  
NO OTHER EASEMENT RECORD RESEARCH WAS PERFORMED BY GORRONDONA & ASSOCIATES INC.

- a) Easement as shown in instrument from John Norris to Texas Pipeline Company, dated November 4, 1945 and filed in Volume 163, Page 290, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- d) Easement as shown in instrument from John Norris to George H. Tiggart, dated March 10, 1945 and filed in Volume 186, Page 57, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- e) Easement as shown in instrument from John Norris to Texas Pipeline Co., dated August 25, 1946 and filed in Volume 180, Page 75, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- f) Easement as shown in instrument from Johnnie Hobbs, et al to Texas Pipeline Company, dated June 30, 1951 and filed in Volume 242, Page 181, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- g) Easement as shown in instrument from J.R. Cox to Texas Central Power Co., dated January 28, 1926 and filed in Volume 73, Page 193, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, blanket in nature)
- n) Easement as shown in instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 276, Page 36, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- i) Easement as shown in instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 282, Page 450, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- j) Easement as shown in instrument from G.W. Townsend to Atlantic Refining Co., dated April 28, 1928 and filed in Volume 209, Page 466, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- k) Easement for electric transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated August 12, 1925 and filed in Volume 458, Page 382, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- l) Easement for electric transmission line as shown in instrument from Lois Win Hecker to C.P. & L., dated June 18, 1920 and filed in Volume 262, Page 446, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- m) Pipeline easement as shown in instrument from J.B. Gary, Jr. et al to Texas Ethanol Natural Gas Pipeline Company, dated August 8, 1950 and filed in Volume 230, Page 315, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- n) Pipeline easement as shown in instrument from J.B. Gary Estate to Humble Pipeline Company, dated December 13, 1931 and filed in Volume 243, Page 243, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- o) Pipeline easement as shown in instrument from J.B. Gary, Jr., Trustee to Humble Pipeline Co., dated February 13, 1967 and filed in Volume 381, Page 105, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- p) Pipeline easement as shown in instrument from Annie E. Taylor to Atlantic Oil Production Co., dated January 11, 1926 and filed in Volume 71, Page 388, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- q) Pipeline easement as shown in instrument from Annie E. Taylor to Atlantic Production Co., dated January 26, 1926 and filed in Volume 71, Page 490, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- r) Pipeline easement as shown in instrument from Annie E. Taylor to Sinclair Texas Pipeline Co., dated April 19, 1928 and filed in Volume 73, Page 462, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- s) Pipeline easement as shown in instrument from Annie E. Taylor to Humble Pipeline Co., dated March 21, 1926 and filed in Volume 74, Page 617, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- t) Easement for electric transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated February 17, 1922 and filed in Volume 433, Page 409, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- u) Easement for electric transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, Page 409, Deed Records of Wharton County, Texas. (Does affect subject tract and is shown hereon)
- v) 10 ft. wide easement for electrical lines as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, Page 408, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- w) Easement for electric transmission line as shown in instrument from Ada Houston Cox to C. P. & L., dated May 12, 1925 and filed in Volume 284, Page 270, Deed Records of Wharton County, Texas. (Does affect subject tract, unable to plot, blanket in nature)
- x) Easement for pipeline as shown in instrument from Ada Houston Cox to Sotha Petroleum Co., dated June 30, 1924 and filed in Volume 270, Page 563, Deed Records of Wharton County, Texas. (Does affect subject tract, unable to plot, blanket in nature)
- y) Easement for electric transmission line as shown in instrument from J.R. Cox to Houston Lighting & Power Co., dated March 29, 1926 and filed in Volume 74, Page 222, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, blanket in nature)
- z) Easement for electric transmission line as shown in instrument from Ada H. Cox to H. L. & P., dated March 2, 1951 and filed in Volume 347, Page 207, Deed Records of Wharton County, Texas. (Does affect subject tract, unable to plot, blanket in nature)
- aa) Easement for electric transmission line as shown in instrument from F. Gordon, et al to Houston Lighting & Power Co., dated January 12, 1951 and filed in Volume 327, Page 336, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- bb) 22 ft. wide easement for road along Northwest line of subject property as shown by that of said Subdivision, filed in Volume 37, Page 640, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, blanket in nature)

HORIZONTAL DATUM: NAD83/NSRS2011  
VERTICAL DATUM: NAVD 82  
COMBINED SCALE FACTOR: 1.00037640  
BEARING BASIS: TEXAS LAMBERT (OR) CENTRAL ZONE, NAD83/NSRS2011  
NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640



Gorrondona & Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
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ACAD FILE: LGRW114A-0001A.dwg  
WORD FILE: LGRW114A-0001A.doc  
REVISION: 1  
SCALE: 1"=600'  
DATE: 1/15/2013  
WO NO.: 72166  
FIELD BOOK: LCRA2  
DRAWN BY: R. Eckert

169.492 ACRE TRACT CUT OF  
SYLVANUS CASTLEMAN SURVEY No. 4  
ABSTRACT No. 11  
D. DAVIS & D. BAKER SURVEY  
ABSTRACT No. 71  
AND JOHN McCROSKY SURVEY No. 2  
ABSTRACT No. 630  
WHARTON COUNTY, TEXAS



MID-COAST TITLE CO., INC.  
111 N. Fulton  
Wharton, TX 77488

STATE OF TEXAS COUNTY OF WHARTON  
I, hereby certify that this document was filed on the date  
and time stamped and was recorded  
on 07/01/2013 2:38 PM

*Handwritten signature*

COUNTY CLERK, Wharton County, Texas  
By: *[Signature]* Deputy

SCANNED



Space Above This Line Reserved For Recording Data

**NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OF THE FOLLOWING INFORMATION FROM THIS INSTRUMENT BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.**

GF#2012-0904

**WAIVER OF SURFACE RIGHTS AND  
DESIGNATION OF DRILLSITES**

**Date:** June 26, 2013

**Grantor:** CARAVELAS COMPANY, a Delaware corporation, successor by domestication to CARAVELAS COMPANY, N.V., a Netherlands Antilles Company

**Grantor's Mailing Address:**

P.O. Box 217  
Urbana, Illinois 61803-0217

**Grantee:** LOWER COLORADO RIVER AUTHORITY

**Grantee's Mailing Address:**

P. O. Box 220  
Austin, Texas 78767

**Consideration:** TEN (\$10.00) DOLLARS cash and other valuable consideration paid by Grantee to GRANTOR, the receipt of which is hereby acknowledged and confessed, GRANTOR.

**Property (including any improvements):**

**TRACT ONE:**

Being a 1063.187 acre tract of land situated in Sylvanus Castleman Survey No. 4, Abstract No. 11 and Sylvanus Castleman Survey No. 5, Abstract No. 12, both in Wharton County, Texas, Said 1063.187 Acre Tract of Land Being a Portion of Block 38, Block 39, Block 47, and Block 70, Re-subdivision of lands of Missouri-Lincoln Trust Company, as Recorded in Volume 37, Page 640 of the Deed Records of Wharton County, Texas (D.R.W.C.T.), said 1063.187 acre tract of land also being a portion of Lot 13, Lot 14, Lot 15, and Lot 16, Block 101 of said Re-subdivision of Lands of Missouri-Lincoln Trust Company, Said 1063.187 acre tract of land being all of Lot 1, Lot 2, Lot 3, Lot 4, Lot 5, Lot 6, Lot 7, Lot 8, Lot 9, Lot 10, Lot 11, Lot 12, Lot 17, Lot 18, and Lot 19, Block 101, of Said Re-subdivision of Lands of Missouri-Lincoln Trust Company, Said 1063.187 acre tract of land being all of Lot 1, Lot 2, Lot 3, Lot 4, and Lot 5, Block 102, of Said Re-subdivision of Lands of Missouri-Lincoln Trust Company, said 1063.187 acre tract of land being all of Lot 1, Lot 2, Lot 3, Lot 4, Lot 5, Lot 6, Lot 7, Lot 8, Lot 9, Lot 10, Lot 11, and Lot 12, Block 103, of Said Re-subdivision of Lands of Missouri-Lincoln Trust Company, said 1063.187 acre tract of land being a portion of Lot 13, Block 105, of Said Re-subdivision of Lands of Missouri-Lincoln Trust Company, said 1063.187 acre tract of land being all of Tract I, a 1059.68 acre Tract of land (By Deed), Described in Deed from Henderson Farms, Inc., to Caravelas Company, N.V., Executed January 3, 1977, Recorded in Volume 491, Page 186, D.R.W.C.T., said 1063.187 acre tract of land being more particularly described on **EXHIBIT "A"** attached hereto and made a part hereof for all purposes.



**TRACT TWO:**

Being a 379.090 acre tract of land situated in Sylvanus Castleman Survey No. 5, Abstract No. 12, John McCrosky Survey No 2, Abstract No. 630, and Gulf, Western Texas & Pacific Railway Company Survey No. 1, Abstract No. 625, All in Wharton County, Texas, said 379.090 Acre Tract of Land being a portion of Block 48 and Block 69, Re-subdivision of Lands of Missouri-Lincoln Trust Company, as Recorded in Volume 37, Page 640 of the Deed Records of Wharton County, Texas (D.R.W.C.T.), said 379.090 acre tract of land being all of Tract III, a 379.68 Acre tract of land (By Deed), Described in Deed from Henderson Farms, Inc. to Caravelas Company, N.V., Executed January 3, 1977, Recorded in Volume 491, Page 186, D.R.W.C.T., said 379.090 acre tract of land being more particularly described metes and bounds on **EXHIBIT "B"** attached hereto and made a part hereof for all purposes.

**TRACT THREE:**

Being a 189.492 acre tract of land situated in Sylvanus Castleman Survey No.4, Abstract No. 11, D. Davis & D. Baker Survey, Abstract No. 71, and John McCrosky Survey No. 2, Abstract No. 630, all in Wharton County, Texas, said 189.492 acre tract of land being a portion of Block 38 and Block 39, Re-subdivision of Lands of Missouri-Lincoln Trust Company, as Recorded in Volume 37, Page 640 of the Deed Records of Wharton County, Texas (D.R.W.C.T.), said 189.492 Acre Tract of Land being all of Tract II, a 189.51 acre tract of land (By Deed), described in Deed from Henderson Farms, Inc., to Caravelas Company, N.V., Executed January 3, 1977, Recorded in Volume 491, Page 186, D.R.W.C.T., Said 189.492 acre tract of land being more particularly described metes and bounds on **EXHIBIT "C"** attached hereto and made a part hereof for all purposes.

**Drillsites: Being three (3) drillsites located in the Sylvanius Castleman League No. 4, Abstract No. 11, and the D.D.D. Baker Survey, Abstract No. 71 in Wharton County, Texas, and being more particularly described on EXHIBIT "D" page 1-4, and EXHIBIT "E" pages 1-3 attached hereto and made a part hereof for all purposes.**

**Waiver of Surface Usage and Designation of Drillsite Locations:**

In order to provide for the development of the surface of the Property, and for the consideration above specified Grantor further grants to Grantee, except as hereafter provided, all Grantor's rights to use and/or come upon the surface of the Property described in attached Exhibit "A" to drill for or produce and otherwise utilize the minerals reserved by Grantor, and Grantor waives all of its rights (except as hereinafter specified) to use the surface of the Property, for all purposes, including, but not limited to, the exploration for and/or development of the minerals reserved by Grantors through any method then or thereafter known or used; provided, however, that Grantor shall have the right and retains for itself and its successors-in-interest, all rights to explore for, to drill and produce oil, gas and other minerals underlying or situated 500 feet or more below the surface of the Property by those means that do not use the surface of the Property or interfere with the use of the surface of the Property, including wells directionally drilled from surface locations on nearby lands (including the designated Drillsites) and by pooling or unitizing all or part of the Property with nearby lands where oil and gas operations may be conducted. The Grantor specifically reserves the right to perform across the entire tract described in the attached Exhibit "A" seismograph or vibrosize studies to explore for oil, gas and minerals, but only to the extent that such studies do not interfere with Grantee's use of the Property for its own purposes.

For and in consideration of the waiver of rights to use the surface of the Property provided in the preceding paragraph, Grantee hereby covenants and agrees with Grantor as follows:

a. Designation of Drillsite. Notwithstanding the matter set forth above, Grantor, for itself, shall have the non-exclusive right (together with Grantee and other mineral owners, if any) to use the surface of the Drillsites, for the exploration of, development of, drilling and initial and ongoing production of oil, gas and other similar hydrocarbon minerals in and under the Property. Grantor's right to develop and produce such oil, gas and other similar minerals from the surface of the Drillsite shall be limited solely to development, drilling and production through the bores of wells drilled on the Drillsite, and in no event shall Grantor, or its, successors, legal representatives or assigns, ever have the right to develop and produce said oil, gas and other similar hydrocarbons from the surface of the Property in any other manner provided, however, that the surface of the Drillsites may be used in combination with the surface of adjacent property owned by Grantor for joint production from the Drillsite or from wellsites located on such adjacent property. Upon commencement of operations upon the Drillsite, Grantee may require the mineral Lessee or operator to fence the Drillsite (as hereinafter defined) to separate the same from the other property of Grantee using four strands of barbed wire except for those fences which are also outside boundary fences for the entire tract. For such boundary fences, the materials shall be the same as the boundary fence. The mineral Lessee shall install a gate for each drillsite used. Following the completion of drilling and assuming Grantor's intention to undertake production efforts, all activities associated with initial and ongoing production will be permitted on, but limited to production improvements located on the Drillsite, including, but not limited to above ground improvements necessary and typical in the industry for production of oil, gas and other similar hydrocarbons (including meter and dehydration structures necessary for gathering line transportation purposes), subject to the aforesaid provision that the surface of the Drillsite may be used in combination with the surfaces of adjacent property for joint production from wellsites located on such adjacent property. Notwithstanding anything herein to the contrary, Grantor's right to explore for, develop, drill, and produce oil, gas, and similar hydrocarbons under lying or situated beneath the Property is limited to oil, gas, and hydrocarbons lying 500 feet or more below the surface of the earth.

b. Access Rights to the Drillsite. In addition to the rights afforded Grantor in Paragraph a. above, Grantee agrees to provide adequate vehicular access to and from the Drillsites as well as access for the purpose of laying of buried gas and salt water gathering lines to and from wells drilled from the surface of the Drillsites.

c. Directional Drilling. Grantor and Grantee confirm that Grantor shall have the right to explore for and develop the minerals retained by Grantor through directional drilling from the Drillsite or from surface locations in the vicinity of the Property, but not on the surface of the Property. Grantor shall not authorize any activity which will impair the subsurface support of the property outside the drillsites.

d. Non-Combination. Grantor for itself and its successors, legal representatives, and assigns, including any lessees of the mineral estate reserved by Grantor to their successors and assigns, covenant and agree not to use the surface of the Property through any rights obtained from the undivided mineral interests in the Property owned by persons other than the Grantor, which covenant is a covenant running with the land and with any mineral interest reserved by Grantor and is binding upon the owner of any part of the mineral interest reserved by Grantor and any lessee thereof.

e. Covenants. The covenants contained herein are for the benefit of the Property and the mineral interests in and under the Property reserved by Grantor herein and shall be covenants running with the Property and shall be binding upon and shall inure to the benefit of Grantor and Grantee, and their respective successors, legal representatives, heirs and assigns.

f. Hunting and Fishing. Grantor shall not have the right to use the Drillsites or the Property for hunting or fishing purposes or to grant such permission to anyone.

g. Assignment of Claim. In the event that Grantor's mineral Lessee shall discharge saltwater or substances classified by a governmental agency as harmful to the land on Grantee's property, or otherwise damage Grantee's or assigns property and roads purchased from Grantor, then Grantor, in exchange for a complete release of liability executed by Grantee or Grantee's assigns to Grantor, the Grantor will assign its claims for breach of contract and damages to Grantee or Grantee's assigns.

h. Electrical Power. Grantee agrees that no electric power line poles may be placed upon the surface of the Drillsites.

This agreement may be executed in multiple counterparts, each of which shall be binding upon the signing part or parties thereto as fully as if all parties had executed one instrument, and all such counterparts shall constitute one and the same instrument. The signature pages of the parties as affixed to the counterparts may be combined, treated and given effect for all purposes, including recordation, into one single instrument.

The Grantee hereby accepts this Waiver of Surface Rights and Designation of Drillsites subject to the conditions, reservations and exceptions contained herein.

When the context requires singular nouns and pronouns include the plural.

**GRANTOR:**

**CARAVELAS COMPANY**, a Delaware corporation, successor by domestication to **CARAVELAS COMPANY, N.V.**, a Netherlands Antilles Company

By: \_\_\_\_\_

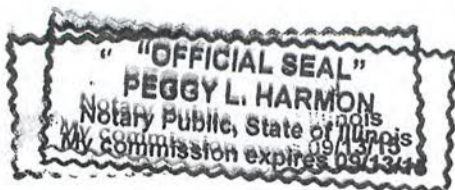
**S. BYRON BALBACH, JR.**, President

**THE STATE OF ILLINOIS** §

**COUNTY OF CHAMPAIGN** §

On this 26 day of June, 2013, before me personally appeared **S. BYRON BALBACH, JR.**, President of **CARAVELAS COMPANY**, on behalf of said company, to me known to be the person described in and who executed the foregoing instrument, and acknowledged that he executed the same as his free act and deed.

\_\_\_\_\_  
NOTARY PUBLIC, STATE OF ILLINOIS



GRANTEE:

LOWER COLORADO RIVER AUTHORITY

By: Fred E. Crawford

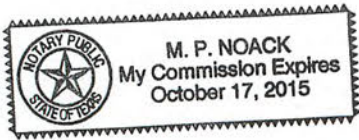
FREDRICK E. CRAWFORD, Manager Real Estate Services



THE STATE OF TEXAS §

COUNTY OF TRAVIS §

On this 26<sup>th</sup> day of June, 2013, before me personally **FREDRICK E. CRAWFORD**, Manager of Real Estate Services of the **LOWER COLORADO RIVER AUTHORITY**, to me known to be the person described in and who executed the foregoing instrument, and acknowledged that he executed the same as his free act and deed, in the capacity therein stated.



M P Noack  
NOTARY PUBLIC, STATE OF TEXAS

PREPARED IN THE OFFICE OF AND  
AFTER RECORDING RETURN TO:

Duckett, Bouligny & Collins, LLP  
207 W. Jackson  
P.O. Box 1567  
El Campo, TX 77437  
Tel: (979) 543-6845  
Fax: (979) 543-9516

Y:\ABC Clients\Caravelas Company, Inc\LCRA\Waiver surface rights & designation drillsites.wpd

EXHIBIT " A "

BEING A 1063.187 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11 AND SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12, BOTH IN WHARTON COUNTY, TEXAS, SAID 1063.187 ACRE TRACT OF LAND BEING A PORTION OF BLOCK 38, BLOCK 39, BLOCK 47, AND BLOCK 70, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 1063.187 ACRE TRACT OF LAND ALSO BEING A PORTION OF LOT 13, LOT 14, LOT 15, AND LOT 16, BLOCK 101 OF SAID RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, SAID 1063.187 ACRE TRACT OF LAND BEING ALL OF LOT 1, LOT 2, LOT 3, LOT 4, LOT 5, LOT 6, LOT 7, LOT 8, LOT 9, LOT 10, LOT 11, LOT 12, LOT 17, LOT 18, AND LOT 19, BLOCK 101, OF SAID RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, SAID 1063.187 ACRE TRACT OF LAND BEING ALL OF LOT 1, LOT 2, LOT 3, LOT 4, AND LOT 5, BLOCK 102, OF SAID RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, SAID 1063.187 ACRE TRACT OF LAND BEING ALL OF LOT 1, LOT 2, LOT 3, LOT 4, LOT 5, LOT 6, LOT 7, LOT 8, LOT 9, LOT 10, LOT 11, AND LOT 12, BLOCK 103, OF SAID RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, SAID 1063.187 ACRE TRACT OF LAND BEING A PORTION OF LOT 13, BLOCK 105, OF SAID RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, SAID 1063.187 ACRE TRACT OF LAND BEING ALL OF TRACT I, A 1059.68 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM HENDERSON FARMS, INC., TO CARAVELAS COMPANY, N.V., EXECUTED JANUARY 3, 1977, RECORDED IN VOLUME 491, PAGE 186, D.R.W.C.T., SAID 1063.187 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

**BEGINNING** at an axle found (Grid Coordinates N=9,697,617.94 US Feet, E=3,662,320.72 US Feet) for an interior ell corner of said Tract I and for the northwest corner of a 277.33 acre tract of land (by deed), described in deed from F. D. Gavranovic to F. D. Gavranovic, Jr., executed October 29, 1997, recorded in Volume 255, Page 813 of the Official Records of Wharton County, Texas, (O.R.W.C.T.);

**THENCE** South 31 degrees 56 minutes 22 seconds East, with an interior line of said Tract I and with the southwest line of said 277.33 acre tract of land, a distance of 1628.93 feet to a 5/8 inch iron rod found for an exterior ell corner of said Tract I and for the south corner of said 277.33 acre tract of land, said 5/8 inch iron rod being in the south line of said Block 70, in the north line of Block 71 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, and in the north line of Tract Three, a 188.69 acre tract of land (by deed), described in deed from Joan Reid Anderson and husband, Keith Anderson to Jean Reid Severn, executed November 1, 1979, recorded in Volume 525, Page 612, D.R.W.C.T.;

**THENCE** South 59 degrees 50 minutes 29 seconds West, with an interior line of said Tract I, with the north line of said Tract Three, with the south line of said Block 70, and with the north line of said Block 71, passing at a distance of 1914.13 feet, a 5/8 inch iron rod with cap stamped "GORRONDONA" set for reference, in all, a distance of 1964.13 feet to a calculated point in the approximate centerline of Jarvis Creek, for an interior ell corner of said Tract I and for the west corner of said Tract Three;

**THENCE**, with an interior line of said Tract I, with the southwest line of said Tract Three, with the west line of a 562.205 acre tract of land (by deed), described in deed from Maxim Productions Co., LP to DCVK, Limited Partnership, executed May 9, 2005, recorded in Volume 607, Page 247, O.R.W.C.T., and with the approximate centerline of Jarvis Creek the following eighty-six (86) courses:

1. South 28 degrees 01 minute 51 seconds East, a distance of 58.58 feet to a point for corner;
2. South 18 degrees 38 minutes 44 seconds East, a distance of 79.27 feet to a point for corner;
3. North 89 degrees 52 minutes 18 seconds East, a distance of 198.90 feet to a point for corner;
4. South 48 degrees 32 minutes 13 seconds East, a distance of 149.25 feet to a point for corner;
5. South 06 degrees 02 minutes 26 seconds East, a distance of 118.89 feet to a point for corner;
6. South 07 degrees 06 minutes 59 seconds East, a distance of 160.38 feet to a point for corner;



7. South 09 degrees 20 minutes 23 seconds East, a distance of 135.19 feet to a point for corner;
8. South 60 degrees 18 minutes 44 seconds East, a distance of 183.95 feet to a point for corner;
9. South 80 degrees 57 minutes 58 seconds East, a distance of 74.19 feet to a point for corner;
10. South 80 degrees 34 minutes 22 seconds East, a distance of 141.05 feet to a point for corner;
11. South 60 degrees 44 minutes 04 seconds East, a distance of 85.28 feet to a point for corner;
12. South 39 degrees 37 minutes 15 seconds East, a distance of 69.33 feet to a point for corner;
13. South 24 degrees 02 minutes 21 seconds East, a distance of 118.86 feet to a point for corner;
14. South 17 degrees 24 minutes 47 seconds East, a distance of 138.99 feet to a point for corner;
15. South 10 degrees 07 minutes 00 seconds East, a distance of 67.56 feet to a point for corner;
16. South 25 degrees 03 minutes 07 seconds East, a distance of 106.82 feet to a point for corner;
17. South 39 degrees 44 minutes 27 seconds East, a distance of 107.71 feet to a point for corner;
18. South 16 degrees 30 minutes 02 seconds East, a distance of 116.16 feet to a point for corner;
19. South 14 degrees 20 minutes 05 seconds West, a distance of 77.99 feet to a point for corner;
20. South 82 degrees 20 minutes 02 seconds West, a distance of 29.00 feet to a point for corner;
21. South 27 degrees 22 minutes 19 seconds West, a distance of 126.62 feet to a point for corner;
22. South 03 degrees 56 minutes 55 seconds West, a distance of 153.86 feet to a point for corner;
23. South 05 degrees 16 minutes 16 seconds West, a distance of 74.70 feet to a point for corner;
24. South 06 degrees 59 minutes 08 seconds East, a distance of 120.00 feet to a point for corner;
25. South 39 degrees 23 minutes 46 seconds East, a distance of 67.81 feet to a point for corner;
26. North 87 degrees 01 minute 53 seconds East, a distance of 46.12 feet to a point for corner;
27. South 59 degrees 31 minutes 40 seconds East, a distance of 34.36 feet to a point for corner;
28. South 80 degrees 36 minutes 22 seconds East, a distance of 135.33 feet to a point for corner;
29. South 81 degrees 40 minutes 25 seconds East, a distance of 130.28 feet to a point for corner;
30. South 75 degrees 27 minutes 32 seconds East, a distance of 92.30 feet to a point for corner;

31. South 88 degrees 57 minutes 14 seconds East, a distance of 77.31 feet to a point for corner;
32. North 67 degrees 05 minutes 20 seconds East, a distance of 108.75 feet to a point for corner;
33. North 65 degrees 43 minutes 19 seconds East, a distance of 129.72 feet to a point for corner;
34. North 84 degrees 57 minutes 55 seconds East, a distance of 44.22 feet to a point for corner;
35. South 71 degrees 20 minutes 36 seconds East, a distance of 37.18 feet to a point for corner;
36. South 51 degrees 48 minutes 51 seconds East, a distance of 29.81 feet to a point for corner;
37. South 01 degree 08 minutes 11 seconds East, a distance of 44.70 feet to a point for corner;
38. South 53 degrees 06 minutes 12 seconds East, a distance of 85.79 feet to a point for corner;
39. South 00 degrees 52 minutes 20 seconds East, a distance of 55.77 feet to a point for corner;
40. South 16 degrees 28 minutes 27 seconds East, a distance of 109.57 feet to a point for corner;
41. South 00 degrees 02 minutes 45 seconds West, a distance of 73.15 feet to a point for corner;
42. South 00 degrees 08 minutes 02 seconds East, a distance of 128.00 feet to a point for corner;
43. South 86 degrees 53 minutes 25 seconds West, a distance of 47.89 feet to a point for corner;
44. South 09 degrees 46 minutes 18 seconds West, a distance of 111.53 feet to a point for corner;
45. South 29 degrees 17 minutes 13 seconds East, a distance of 100.34 feet to a point for corner;
46. South 13 degrees 01 minute 03 seconds East, a distance of 87.59 feet to a point for corner;
47. South 14 degrees 07 minutes 01 second West, a distance of 93.88 feet to a point for corner;
48. South 63 degrees 51 minutes 24 seconds West, a distance of 46.39 feet to a point for corner;
49. South 02 degrees 30 minutes 20 seconds East, a distance of 82.42 feet to a point for corner;
50. South 01 degree 24 minutes 32 seconds West, a distance of 86.52 feet to a point for corner;
51. South 33 degrees 38 minutes 43 seconds East, a distance of 77.27 feet to a point for corner;
52. South 74 degrees 08 minutes 20 seconds East, a distance of 72.88 feet to a point for corner;
53. South 40 degrees 54 minutes 30 seconds East, a distance of 50.74 feet to a point for corner;
54. South 29 degrees 00 minutes 14 seconds East, a distance of 94.99 feet to a point for corner;

55. South 86 degrees 55 minutes 06 seconds East, a distance of 61.34 feet to a point for corner;
56. South 57 degrees 13 minutes 23 seconds East, a distance of 88.10 feet to a point for corner;
57. South 19 degrees 37 minutes 43 seconds East, passing at a distance of 122.89 feet, a calculated point for the south corner of said Tract Three and for the most northerly northwest corner of said 562.205 acre tract of land, from which a 1/2 inch iron pipe with cap stamped "KALKOMEY" found for reference, bears, North 59 degrees 42 minutes 23 seconds East, a distance of 75.12 feet, continuing in all, a distance of 128.18 feet to a point for corner;
58. South 27 degrees 14 minutes 19 seconds East, a distance of 185.00 feet to a point for corner;
59. South 40 degrees 47 minutes 52 seconds East, a distance of 183.43 feet to a point for corner;
60. South 64 degrees 50 minutes 48 seconds East, a distance of 105.85 feet to a point for corner;
61. South 24 degrees 38 minutes 19 seconds East, a distance of 54.92 feet to a point for corner;
62. South 00 degrees 18 minutes 13 seconds East, a distance of 94.12 feet to a point for corner;
63. South 07 degrees 25 minutes 32 seconds West, a distance of 149.66 feet to a point for corner;
64. South 25 degrees 17 minutes 52 seconds East, a distance of 54.27 feet to a point for corner;
65. South 20 degrees 12 minutes 42 seconds West, a distance of 51.76 feet to a point for corner;
66. South 65 degrees 42 minutes 02 seconds West, a distance of 209.64 feet to a point for corner;
67. South 72 degrees 42 minutes 01 seconds West, a distance of 106.48 feet to a point for corner;
68. South 70 degrees 56 minutes 11 seconds West, a distance of 96.58 feet to a point for corner;
69. South 44 degrees 12 minutes 37 seconds West, a distance of 97.58 feet to a point for corner;
70. South 48 degrees 26 minutes 53 seconds West, a distance of 83.63 feet to a point for corner;
71. South 02 degrees 51 minutes 44 seconds East, a distance of 138.48 feet to a point for corner;
72. South 65 degrees 29 minutes 59 seconds East, a distance of 178.02 feet to a point for corner;
73. North 81 degrees 29 minutes 13 seconds East, a distance of 153.93 feet to a point for corner;
74. South 78 degrees 57 minutes 01 second East, a distance of 37.45 feet to a point for corner;
75. South 04 degrees 32 minutes 19 seconds West, a distance of 60.94 feet to a point for corner;
76. South 48 degrees 30 minutes 34 seconds West, a distance of 137.38 feet to a point for corner;
77. South 34 degrees 33 minutes 32 seconds West, a distance of 159.54 feet to a point for corner;



78. South 49 degrees 47 minutes 05 seconds West, a distance of 76.20 feet to a point for corner;
79. South 34 degrees 48 minutes 35 seconds West, a distance of 132.76 feet to a point for corner;
80. South 48 degrees 14 minutes 14 seconds East, a distance of 79.44 feet to a point for corner;
81. North 79 degrees 59 minutes 35 seconds East, a distance of 113.63 feet to a point for corner;
82. South 46 degrees 11 minutes 35 seconds East, a distance of 95.36 feet to a point for corner;
83. South 09 degrees 22 minutes 37 seconds East, a distance of 168.13 feet to a point for corner;
84. South 04 degrees 30 minutes 02 seconds West, a distance of 80.21 feet to a point for corner;
85. South 30 degrees 05 minutes 17 seconds West, a distance of 62.90 feet to a point for corner;
86. South 58 degrees 57 minutes 30 seconds West, a distance of 155.91 feet to a point for the intersection of an interior line of said Tract I, the west line of said 562.205 acre tract of land, and the approximate centerline of Jarvis Creek with the approximate east vegetation line of the Colorado River;

**THENCE**, with the southwest line of said Tract I and with the approximate east vegetation line of the Colorado River, the following 46 courses:

1. North 61 degrees 36 minutes 19 seconds West, a distance of 320.75 feet to a point for corner;
2. North 70 degrees 59 minutes 03 seconds West, a distance of 246.36 feet to a point for corner;
3. North 73 degrees 41 minutes 20 seconds West, a distance of 242.77 feet to a point for corner;
4. North 82 degrees 05 minutes 46 seconds West, a distance of 303.56 feet to a point for corner;
5. North 80 degrees 41 minutes 26 seconds West, a distance of 415.25 feet to a point for corner;
6. North 88 degrees 37 minutes 34 seconds West, a distance of 308.32 feet to a point for corner;
7. South 81 degrees 55 minutes 41 seconds West, a distance of 367.60 feet to a point for corner;
8. South 72 degrees 03 minutes 48 seconds West, a distance of 468.59 feet to a point for corner;
9. South 46 degrees 28 minutes 14 seconds West, a distance of 345.71 feet to a point for corner;
10. South 40 degrees 09 minutes 24 seconds West, a distance of 275.10 feet to a point for corner;
11. South 49 degrees 22 minutes 52 seconds West, a distance of 337.02 feet to a point for corner;
12. South 60 degrees 15 minutes 38 seconds West, a distance of 387.68 feet to a point for corner;
13. South 49 degrees 45 minutes 10 seconds West, a distance of 347.05 feet to a point for corner;
14. South 67 degrees 58 minutes 53 seconds West, a distance of 308.96 feet to a point for corner;

15. South 82 degrees 38 minutes 26 seconds West, a distance of 280.62 feet to a point for corner;
16. North 84 degrees 43 minutes 54 seconds West, a distance of 214.62 feet to a point for corner;
17. North 57 degrees 25 minutes 50 seconds West, a distance of 289.27 feet to a point for corner;
18. North 62 degrees 47 minutes 38 seconds West, a distance of 250.84 feet to a point for corner;
19. North 35 degrees 33 minutes 13 seconds West, a distance of 181.38 feet to a point for corner;
20. North 12 degrees 25 minutes 32 seconds West, a distance of 145.05 feet to a point for corner;
21. North 13 degrees 42 minutes 22 seconds East, a distance of 212.46 feet to a point for corner;
22. North 21 degrees 38 minutes 10 seconds East, a distance of 201.59 feet to a point for corner;
23. North 30 degrees 26 minutes 43 seconds East, a distance of 435.57 feet to a point for corner;
24. North 27 degrees 43 minutes 01 second East, a distance of 411.93 feet to a point for corner;
25. North 15 degrees 42 minutes 30 seconds East, a distance of 730.73 feet to a point for corner;
26. North 04 degrees 20 minutes 29 seconds East, a distance of 288.07 feet to a point for corner;
27. North 10 degrees 04 minutes 53 seconds East, a distance of 432.43 feet to a point for corner;
28. North 12 degrees 54 minutes 53 seconds East, a distance of 486.28 feet to a point for corner;
29. North 16 degrees 36 minutes 51 seconds East, a distance of 529.37 feet to a point for corner;
30. North 00 degrees 53 minutes 17 seconds East, a distance of 269.82 feet to a point for corner;
31. North 17 degrees 53 minutes 16 seconds West, a distance of 183.85 feet to a point for corner;
32. North 35 degrees 59 minutes 28 seconds West, a distance of 428.15 feet to a point for corner;
33. North 43 degrees 08 minutes 57 seconds West, a distance of 146.40 feet to a point for corner;
34. North 56 degrees 23 minutes 36 seconds West, a distance of 377.55 feet to a point for corner;
35. North 84 degrees 41 minutes 17 seconds West, a distance of 392.71 feet to a point for corner;
36. South 85 degrees 13 minutes 37 seconds West, a distance of 354.23 feet to a point for corner;
37. North 71 degrees 24 minutes 30 seconds West, a distance of 223.94 feet to a point for corner;
38. North 68 degrees 28 minutes 45 seconds West, a distance of 327.58 feet to a point for corner;

39. North 57 degrees 37 minutes 06 seconds West, a distance of 231.74 feet to a point for corner;
40. North 29 degrees 08 minutes 20 seconds West, a distance of 210.06 feet to a point for corner;
41. North 08 degrees 37 minutes 31 seconds West, a distance of 171.38 feet to a point for corner;
42. North 16 degrees 26 minutes 01 second West, a distance of 154.34 feet to a point for corner;
43. North 10 degrees 44 minutes 04 seconds West, a distance of 160.03 feet to a point for corner;
44. North 09 degrees 01 minute 57 seconds East, a distance of 212.00 feet to a point for corner;
45. North 27 degrees 31 minutes 50 seconds West, a distance of 95.98 feet to a point for corner;
46. North 22 degrees 42 minutes 36 seconds West, a distance of 43.57 feet to a point for an exterior ell corner of said Tract I and being in the south line of a 9.979 acre tract of land (by deed), described in a deed from Henderson Farms, Inc. to Lower Colorado River Authority, executed February 7, 1967, recorded in Volume 380, Page 680, D.R.W.C.T.;

**THENCE**, with an interior line of said Tract I and with an interior line of said 9.979 acre tract of land, the following five (5) courses:

1. South 89 degrees 31 minutes 24 seconds East, a distance of 234.75 feet to a concrete monument stamped "L.C.R.A." found for an interior ell corner of said Tract I and for the southeast corner of said 9.979 acre tract of land;
2. North 00 degrees 28 minutes 36 seconds East, a distance of 646.77 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for an interior ell corner of said Tract I and for an exterior ell corner of said 9.979 acre tract of land;
3. North 42 degrees 41 minutes 24 seconds West, a distance of 445.21 to a concrete monument stamped "L.C.R.A." found for an exterior ell corner of said Tract I and for an interior ell corner of said 9.979 acre tract of land;
4. North 59 degrees 48 minutes 36 seconds East, a distance of 533.69 feet to a broken concrete monument found for an interior ell corner of said Tract I and for the most easterly corner of said 9.979 acre tract of land;
5. North 38 degrees 21 minutes 24 seconds West, a distance of 202.05 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the most northerly northwest corner of said Tract I and for the most northerly corner of said 9.979 acre tract of land, in the southeast line of a 17.9 acre tract of land (by deed), described in deed from Gulf Coast Water Company to County of Wharton, Texas, executed June 28, 1939, recorded in Volume 139, Page 608, D.R.W.C.T.;

**THENCE** North 59 degrees 45 minutes 54 seconds East, with the northwest line of said Tract I and with the southeast line of said 17.9 acre tract of land, a distance of 9414.24 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the most northerly corner of said Tract I, in the southwest line of Tract No. 2, a 129.3 acre tract of land (by deed), described in deed from Gulf Coast Rice Farms, Inc. to Gulf Coast Water Company, executed February 20, 1952, recorded in Volume 249, Page 109, D.R.W.C.T. and also being in the southwest line of "Lane City Section" (by deed), described in deed from Gulf Coast Water Company to Lower Colorado River Authority, executed December 31, 1959, recorded in Volume 318, Page 396, D.R.W.C.T.;

**THENCE**, with the northeast line of said Tract I, with the southwest line of said Tract No. 2, and with the southwest line of "Lane City Section" the following two (2) courses:

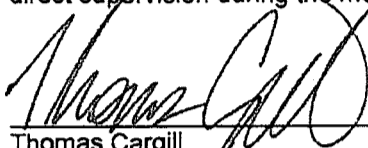
1. South 30 degrees 18 minutes 36 seconds East, a distance of 1223.14 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;
2. Around a curve to the left, an arc distance of 418.11 feet, having a radius of 458.00 feet, a central angle of 52 degrees 18 minutes 19 seconds, and whose chord bears South 56 degrees 27 minutes 45 seconds East, a distance of 403.74 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the most easterly corner of said Tract I and for an exterior ell corner of said 277.33 acre tract of land;

**THENCE** South 60 degrees 08 minutes 23 seconds West, with an interior line of said Tract I and with the northwest line of said 277.33 acre tract of land, a distance of 4859.52 feet to the **POINT OF BEGINNING**, and containing 1063.187 acres of land, more or less.

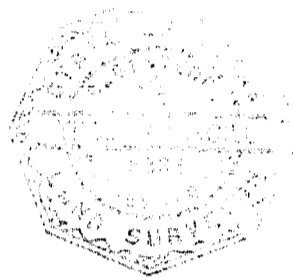
Bearing Basis: Texas Lambert Grid, Central Zone, NAD83/NSRS2007.

All distances are surface values and in U. S. Survey Feet. To compute grid values multiply surface distances by a Combined Scale Factor of 1.00037640.

The field notes and the plat attached hereto represent an on-the-ground survey made under my direct supervision during the months of September 2012 to November 2012.



Thomas Cargill  
Registered Professional Land Surveyor No. 5835  
Gorronzona and Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933



Word File: LCRAW114A-0005B.DOC  
Drawing File: LCRAW114A-0005B.DWG

WHARTON COUNTY, TEXAS

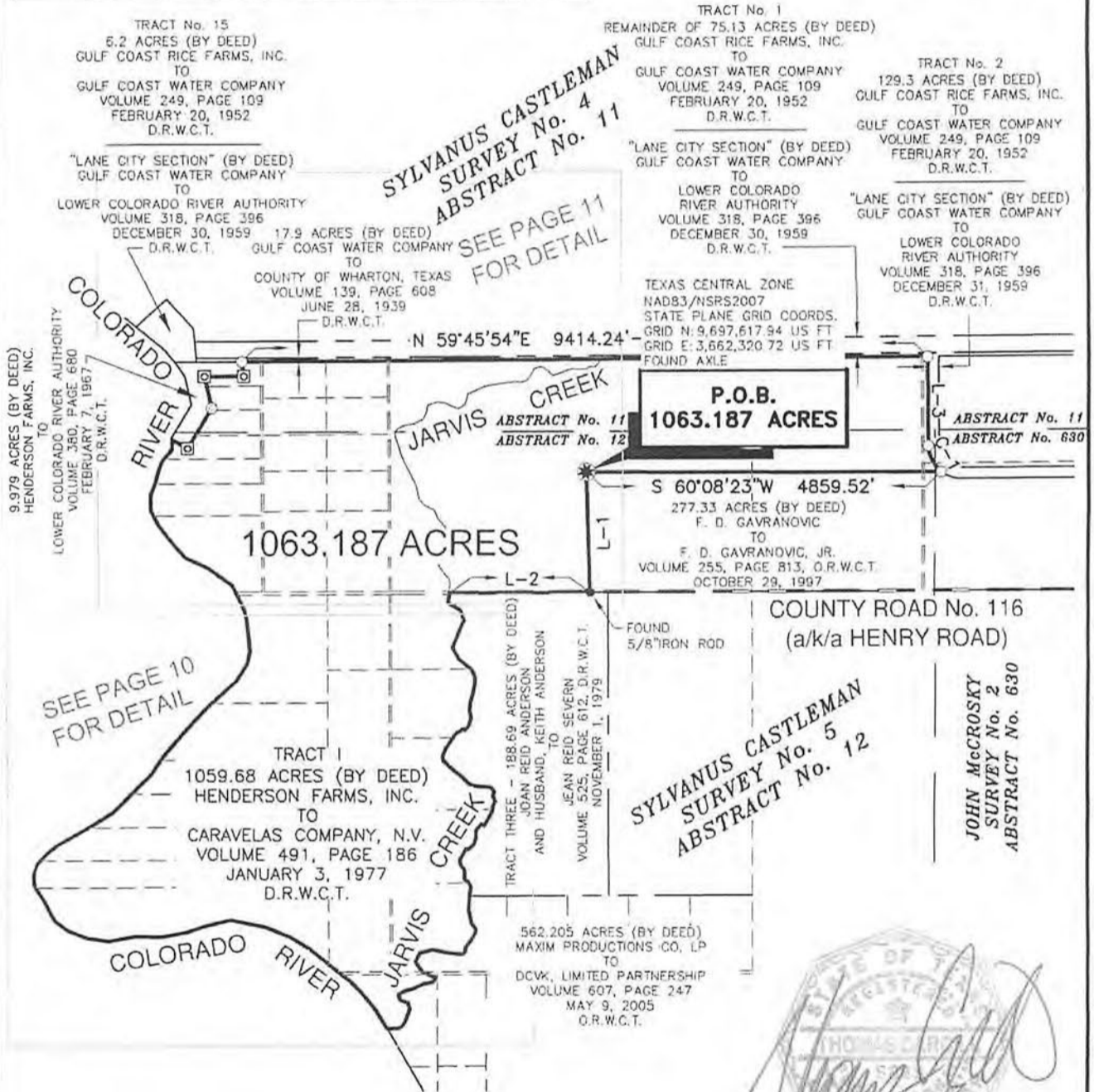
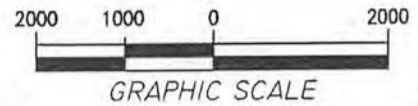
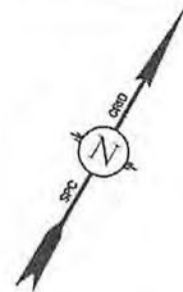
SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11  
 SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12

LEGEND

- ☼ AXLE FOUND
  - 5/8" IRON ROD WITH CAP STAMPED "GORRRONDONA" SET
  - ⊙ IRON PIPE FOUND (SIZE NOTED)
  - IRON ROD FOUND (SIZE NOTED)
  - ⊞ CONCRETE MONUMENT STAMPED "LCRA" FOUND
- D.R.W.C.T DEED RECORDS OF WHARTON COUNTY, TEXAS  
 O.R.W.C.T OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS

LINE TABLE		
LINE	BEARING	DISTANCE
L-1	S 31°56'22"E	1628.93'
L-2	S 59°50'29"W	1964.13'
L-3	S 30°18'36"E	1223.14'

CURVE TABLE					
CURVE	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH	ARC LENGTH
C-1	458.00'	52°18'19"	S 56°27'45"E	403.74'	418.11'



NOTE:  
 SEE PAGE 12 FOR EASEMENT NOTES.  
 HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.

*[Signature]*  
 1/17/2013



Gorrondona & Associates, Inc.  
 4201 W. Parmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 719-9933

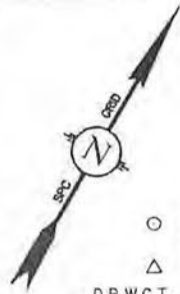
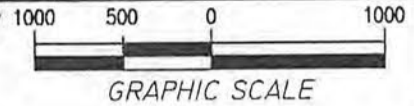
ACAD FILE: LCRAW114A-0005B.dwg  
 WORD FILE: LCRAW114A-0005B.doc  
 REVISION: 2  
 SCALE: 1"=2000'  
 DATE: 1/17/2013  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

1063.187 ACRES OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 4,  
 ABSTRACT No. 11  
 SYLVANUS CASTLEMAN SURVEY No. 5,  
 ABSTRACT No. 12  
 WHARTON COUNTY, TEXAS

**LCRA**  
 ENERGY • WATER • COMMUNITY SERVICES  
 3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
 (512)473-3200 www.lcra.org

WHARTON COUNTY, TEXAS

SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11  
 SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12



LEGEND

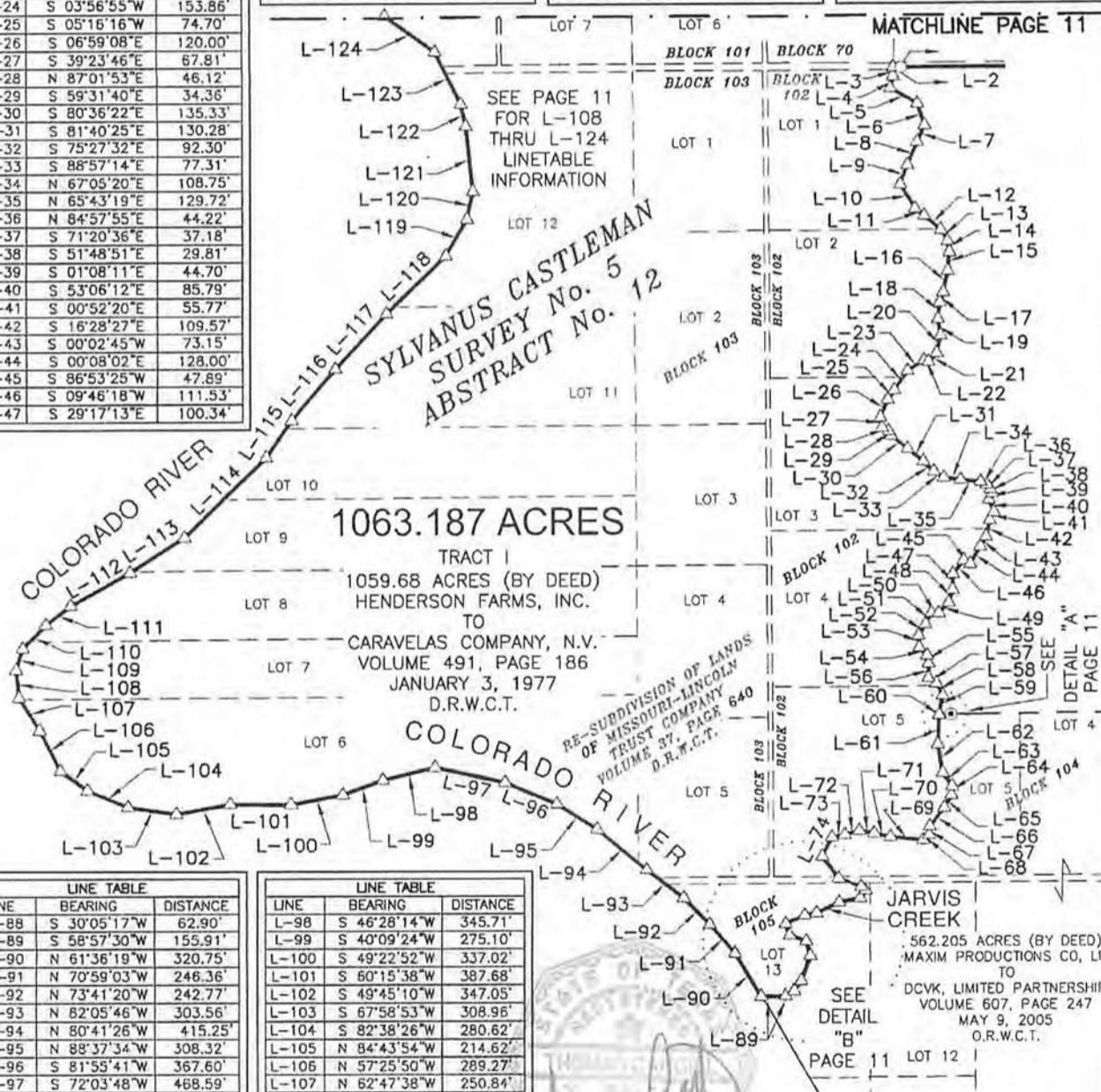
- 5/8" IRON ROD WITH CAP STAMPED "GORRONDONA" SET
- △ CALCULATED POINT
- D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS
- O.R.W.C.T. OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS

LINE	BEARING	DISTANCE
L-2	S 59°50'29"W	1964.13'
L-3	S 28°01'51"E	58.58'
L-4	S 18°38'44"E	79.27'
L-5	N 89°52'18"E	198.90'
L-6	S 48°32'13"E	149.25'
L-7	S 06°02'26"E	118.89'
L-8	S 07°06'59"E	160.38'
L-9	S 09°20'23"E	135.19'
L-10	S 60°18'44"E	183.95'
L-11	S 80°57'58"E	74.19'
L-12	S 80°34'22"E	141.05'
L-13	S 60°44'04"E	85.28'
L-14	S 39°37'15"E	69.33'
L-15	S 24°02'21"E	118.86'
L-16	S 17°24'47"E	138.99'
L-17	S 10°07'00"E	67.56'
L-18	S 25°03'07"E	106.82'
L-19	S 39°44'27"E	107.71'
L-20	S 16°30'02"E	116.16'
L-21	S 14°20'05"W	77.99'
L-22	S 82°20'02"W	29.00'
L-23	S 27°22'19"W	126.82'
L-24	S 03°56'55"W	153.86'
L-25	S 05°16'16"W	74.70'
L-26	S 06°59'08"E	120.00'
L-27	S 39°23'46"E	67.81'
L-28	N 87°01'53"E	46.12'
L-29	S 59°31'40"E	34.36'
L-30	S 80°36'22"E	135.33'
L-31	S 81°40'25"E	130.28'
L-32	S 75°27'32"E	92.30'
L-33	S 88°57'14"E	77.31'
L-34	N 67°05'20"E	108.75'
L-35	N 65°43'19"E	129.72'
L-36	N 84°57'55"E	44.22'
L-37	S 71°20'36"E	37.18'
L-38	S 51°48'51"E	29.81'
L-39	S 01°08'11"E	44.70'
L-40	S 53°06'12"E	85.79'
L-41	S 00°52'20"E	55.77'
L-42	S 16°28'27"E	109.57'
L-43	S 00°02'45"W	73.15'
L-44	S 00°08'02"E	128.00'
L-45	S 86°53'25"W	47.89'
L-46	S 09°46'18"W	111.53'
L-47	S 29°17'13"E	100.34'

LINE	BEARING	DISTANCE
L-48	S 13°01'03"E	87.59'
L-49	S 14°07'01"W	93.88'
L-50	S 63°51'24"W	46.39'
L-51	S 02°30'20"E	82.42'
L-52	S 01°24'32"W	86.52'
L-53	S 33°38'43"E	77.27'
L-54	S 74°08'20"E	72.88'
L-55	S 40°54'30"E	50.74'
L-56	S 29°00'14"E	94.99'
L-57	S 86°55'06"E	61.34'
L-58	S 57°13'23"E	88.10'
L-59	S 19°37'43"E	122.89'
L-60	S 19°37'43"E	5.29'
L-61	S 27°14'19"E	185.00'
L-62	S 40°47'52"E	183.43'
L-63	S 64°50'48"E	105.85'
L-64	S 24°38'19"E	54.92'
L-65	S 00°18'13"E	94.12'
L-66	S 07°25'32"W	149.66'
L-67	S 25°17'52"E	54.27'
L-68	S 20°12'42"W	51.76'
L-69	S 65°42'02"W	209.64'

LINE	BEARING	DISTANCE
L-70	S 72°42'01"W	106.48'
L-71	S 70°56'11"W	96.58'
L-72	S 44°12'37"W	97.58'
L-73	S 48°26'53"W	83.63'
L-74	S 02°51'44"E	138.48'
L-75	S 65°29'59"E	178.02'
L-76	N 81°29'13"E	153.93'
L-77	S 78°57'01"E	37.45'
L-78	S 04°32'19"W	60.94'

LINE	BEARING	DISTANCE
L-79	S 48°30'34"W	137.38'
L-80	S 34°33'32"W	159.54'
L-81	S 49°47'05"W	76.20'
L-82	S 34°48'35"W	132.76'
L-83	S 48°14'14"E	79.44'
L-84	N 79°59'35"E	113.63'
L-85	S 46°11'35"E	95.36'
L-86	S 09°22'37"E	168.13'
L-87	S 04°30'02"W	80.21'



LINE	BEARING	DISTANCE
L-88	S 30°05'17"W	62.90'
L-89	S 58°57'30"W	155.91'
L-90	N 61°36'19"W	320.75'
L-91	N 70°59'03"W	246.36'
L-92	N 73°41'20"W	242.77'
L-93	N 82°05'46"W	303.56'
L-94	N 80°41'26"W	415.25'
L-95	N 88°37'34"W	308.32'
L-96	S 81°55'41"W	367.60'
L-97	S 72°03'48"W	468.59'

LINE	BEARING	DISTANCE
L-98	S 46°28'14"W	345.71'
L-99	S 40°09'24"W	275.10'
L-100	S 49°22'52"W	337.02'
L-101	S 60°15'38"W	387.68'
L-102	S 49°45'10"W	347.05'
L-103	S 67°58'53"W	308.96'
L-104	S 82°38'26"W	280.62'
L-105	N 84°43'54"W	214.62'
L-106	N 57°25'50"W	289.27'
L-107	N 62°47'38"W	250.84'

NOTE:  
 SEE PAGE 12 FOR EASEMENT NOTES.  
 HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640



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 REVISION: 2  
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 DATE: 1/17/2013  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

1063.187 ACRES OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 4,  
 ABSTRACT No. 11  
 SYLVANUS CASTLEMAN SURVEY No. 5,  
 ABSTRACT No. 12  
 WHARTON COUNTY, TEXAS





WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11  
 SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12

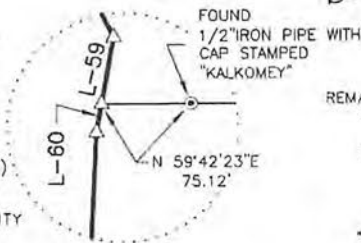
**SYLVANUS CASTLEMAN SURVEY No. 4 ABSTRACT No. 11**

**LEGEND**

- ✱ AXLE FOUND
- 5/8" IRON ROD WITH CAP STAMPED "GORRONDONA" SET
- IRON ROD FOUND (SIZE NOTED)
- △ CALCULATED POINT
- CONCRETE MONUMENT STAMPED "LCRA" FOUND
- D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS
- O.R.W.C.T. OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS

TRACT No. 15  
 5.2 ACRES (BY DEED)  
 GULF COAST RICE FARMS, INC.  
 TO  
 GULF COAST WATER COMPANY  
 VOLUME 249, PAGE 109  
 FEBRUARY 20, 1952  
 D.R.W.C.T.

"LANE CITY SECTION" (BY DEED)  
 GULF COAST WATER COMPANY  
 TO  
 LOWER COLORADO RIVER AUTHORITY  
 VOLUME 318, PAGE 396  
 DECEMBER 30, 1959  
 D.R.W.C.T.



TRACT No. 1  
 REMAINDER OF 75.13 ACRES (BY DEED)  
 GULF COAST RICE FARMS, INC.  
 TO  
 GULF COAST WATER COMPANY  
 VOLUME 249, PAGE 109  
 FEBRUARY 20, 1952  
 D.R.W.C.T.

"LANE CITY SECTION" (BY DEED)  
 GULF COAST WATER COMPANY  
 TO  
 LOWER COLORADO RIVER AUTHORITY  
 VOLUME 318, PAGE 396  
 DECEMBER 30, 1959  
 D.R.W.C.T.

17.9 ACRES (BY DEED)  
 GULF COAST WATER COMPANY  
 TO  
 COUNTY OF WHARTON, TEXAS  
 VOLUME 139, PAGE 608  
 JUNE 28, 1939  
 D.R.W.C.T.

9,979 ACRES (BY DEED)  
 HENDERSON FARMS, INC.  
 TO  
 LOWER COLORADO RIVER AUTHORITY  
 VOLUME 380, PAGE 680  
 FEBRUARY 7, 1967  
 D.R.W.C.T.

L-135  
 L-134  
 L-133  
 L-132  
 L-131  
 L-130  
 L-129  
 L-128  
 L-127  
 L-126  
 L-125  
 L-124  
 L-123

6.5' EASEMENT FOR ELECTRIC TRANSMISSION LINE  
 CENTRAL POWER AND LIGHT COMPANY  
 VOLUME 282, PAGE 448  
 D.R.W.C.T.

N 59°45'54"E 9414.24'

TEXAS CENTRAL ZONE  
 NAD83/NSRS2007  
 STATE PLANE GRID COORDS  
 GRID N: 9,697,617.94 US FT  
 GRID E: 3,662,320.72 US FT  
 FOUND AXLE

**P.O.B. 1063.187 ACRES**

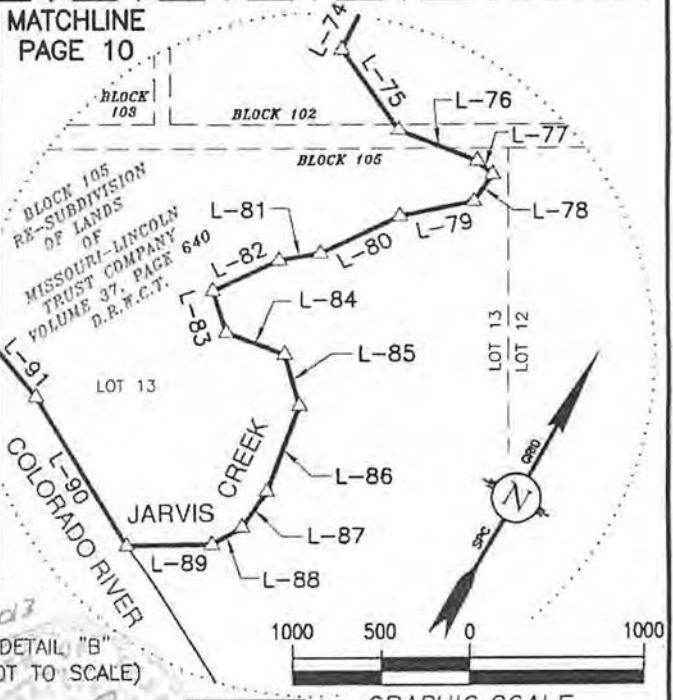
**1063.187 ACRES**

TRACT I  
 1059.68 ACRES (BY DEED)  
 HENDERSON FARMS, INC.  
 TO  
 CARAVELAS COMPANY, N.V.  
 VOLUME 491, PAGE 186  
 JANUARY 3, 1977  
 D.R.W.C.T.

44' ROAD DEDICATION  
 RE-SUBDIVISION  
 MISSOURI-LINCOLN TRUST COMPANY  
 VOLUME 37, PAGE 640  
 D.R.W.C.T.

LINE	BEARING	DISTANCE
L-2	S 59°50'29"W	1964.13'
L-3	S 28°01'51"E	58.58'
L-4	S 18°38'44"E	79.27'
L-59	S 19°37'43"E	122.89'
L-60	S 19°37'43"E	5.29'
L-74	S 02°51'44"E	138.48'
L-75	S 65°29'59"E	178.02'
L-76	N 81°29'13"E	153.93'
L-77	S 78°57'01"E	37.45'
L-78	S 04°32'19"W	60.94'
L-79	S 48°30'34"W	137.38'
L-80	S 34°33'32"W	159.54'
L-81	S 49°47'05"W	76.20'
L-82	S 34°48'35"W	132.76'
L-83	S 48°14'14"E	79.44'
L-84	N 79°59'35"E	113.63'
L-85	S 46°11'35"E	95.36'
L-86	S 09°22'37"E	168.13'
L-87	S 04°30'02"W	80.21'
L-88	S 30°05'17"W	62.90'
L-89	S 58°57'30"W	155.91'
L-90	N 61°36'19"W	320.75'
L-91	N 70°59'03"W	246.36'
L-108	N 35°33'13"W	181.38'
L-109	N 12°25'32"W	145.05'
L-110	N 13°42'22"E	212.46'
L-111	N 21°38'10"E	201.59'
L-112	N 30°26'43"E	435.57'
L-113	N 27°43'01"E	411.93'
L-114	N 15°42'30"E	730.73'
L-115	N 04°20'29"E	288.07'

LINE	BEARING	DISTANCE
L-116	N 10°04'53"E	432.43'
L-117	N 12°54'53"E	486.28'
L-118	N 16°36'51"E	529.37'
L-119	N 00°53'17"E	269.82'
L-120	N 17°53'16"W	183.85'
L-121	N 35°59'28"W	428.15'
L-122	N 43°08'57"W	146.40'
L-123	N 56°23'36"W	377.55'
L-124	N 84°41'17"W	392.71'
L-125	S 85°13'37"W	354.23'
L-126	N 71°24'30"W	223.94'
L-127	N 68°28'45"W	327.58'
L-128	N 57°37'06"W	231.74'
L-129	N 29°08'20"W	210.06'
L-130	N 08°37'31"W	171.38'
L-131	N 16°26'01"W	154.34'
L-132	N 10°44'04"W	160.03'
L-133	N 09°01'57"E	212.00'
L-134	N 27°31'50"W	95.98'
L-135	N 22°42'36"W	43.57'
L-136	S 89°31'24"E	234.75'
L-137	N 00°28'36"E	646.77'
L-138	N 42°41'24"W	445.21'
L-139	N 59°48'36"E	533.69'
L-140	N 38°21'24"W	202.05'



NOTE: SEE PAGE 12 FOR EASEMENT NOTES.

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.



**GRAPHIC SCALE**  
 Gorrondona & Associates, Inc.  
 4201 W. Parmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 719-9933

ACAD FILE: LCRAW114A-0005B.dwg  
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 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

1063.187 ACRES OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 4,  
 ABSTRACT No. 11  
 SYLVANUS CASTLEMAN SURVEY No. 5,  
 ABSTRACT No. 12  
 JOHN McCROSKY SURVEY No. 2,  
 ABSTRACT No. 630  
 WHARTON COUNTY, TEXAS



## WHARTON COUNTY, TEXAS

SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11  
 SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12

ONLY THESE EASEMENTS LISTED IN LIMITED TITLE CERTIFICATE GF No. 2012-0904  
 DATED AUGUST 31, 2012, BY FIRST AMERICAN TITLE INSURANCE COMPANY WERE EVALUATED  
 FOR THIS SURVEY.  
 NO OTHER EASEMENT RECORD RESEARCH WAS PERFORMED BY GORRONDONA & ASSOCIATES INC.

- c) Easement as shown in instrument from John Norris to Texas Pipeline Company, dated November 4, 1945 and filed in Volume 183, Page 290, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- d) Easement as shown in instrument from John Norris to George K. Taggart, dated March 19, 1946 and filed in Volume 186, Page 57, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- e) Easement as shown in instrument from John Norris to Texas Pipeline Co., dated August 28, 1946 and filed in Volume 188, Page 75, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- f) Easement as shown in instrument from Johnnie Hobbs, et al to Texas Pipeline Company, dated June 30, 1951 and filed in Volume 242, Page 181, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- g) Easement as shown in instrument from J.R. Cox to Texas Central Power Co., dated January 28, 1926 and filed in Volume 73, Page 193, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- h) Easement as shown in instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 276, Page 56, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- i) Easement as shown in instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 282, Page 450, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- j) Easement as shown in instrument from G.W. Townsend to Atlantic Refining Co., dated April 28, 1956 and filed in Volume 289, Page 486, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- k) Easement for electric transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated August 12, 1975 and filed in Volume 458, Page 382, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- l) Easement for electric transmission line as shown in instrument from Lois Ann Hecker to C.P. & L., dated June 16, 1955 and filed in Volume 282, Page 448, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- m) Pipeline easement as shown in instrument from J.B. Gary, Jr., et al to Texas Illinois Natural Gas Pipeline Company, dated August 8, 1950 and filed in Volume 230, Page 315, Deed Records of Wharton County, Texas. (Does affect subject tract, unable to plot exact location)
- n) Pipeline easement as shown in instrument from J.B. Gary Estate to Humble Pipeline Company, dated December 13, 1951 and filed in Volume 245, Page 245, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, blanket in nature)
- o) Pipeline easement as shown in instrument from J.B. Gary, Jr., Trustee to Jumble Pipeline Co., dated February 13, 1967 and filed in Volume 381, Page 105, Deed Records of Wharton County, Texas. (Does affect subject tract, and shown hereon)
- p) Pipeline easement as shown in instrument from Annie E. Taylor to Atlantic Oil Production Co., dated January 11, 1926 and filed in Volume 71, Page 388, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, blanket in nature)
- q) Pipeline easement as shown in instrument from Annie E. Taylor to Atlantic Production Co., dated January 26, 1926 and filed in Volume 71, Page 490, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, blanket in nature)
- r) Pipeline easement as shown in instrument from Annie E. Taylor to Sinclair Texas Pipeline Co., dated April 19, 1926 and filed in Volume 73, Page 462, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, blanket in nature)
- s) Pipeline easement as shown in instrument from Annie E. Taylor to Humble Pipeline Co., dated March 21, 1926 and filed in Volume 74, Page 617, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, blanket in nature)
- t) Easement for electrical transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated February 17, 1972 and filed in Volume 423, Page 409, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- u) Easement for electrical transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, Page 409, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- v) 10 ft. wide easement for electrical lines as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, Page 408, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- w) Easement for electric transmission line as shown in instrument from Ada Houston Cox to C.P. & L., dated May 12, 1955 and filed in Volume 284, Page 278, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- x) Easement for pipeline as shown in instrument from Ada Houston Cox to Sohio Petroleum Co., dated June 30, 1954 and filed in Volume 270, Page 565, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- y) Easement for electric transmission line as shown in instrument from J.R. Cox to Houston Lighting & Power Co., dated March 29, 1926 and filed in Volume 74, Page 222, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- z) Easement for electric transmission line as shown in instrument from Ada H. Cox to H.L. & P., dated March 2, 1961 and filed in Volume 347, Page 207 Deed Records of Wharton County, Texas. (Does not affect subject tract)
- aa) Easement for electric transmission line as shown in instrument from T. Gordon, et al to Houston Lighting & Power Co., dated January 12, 1961 and filed in Volume 327, Page 556, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- bb) 22 ft. wide easement for road along Northwest line of subject property as shown by Plat of said Subdivision, filed in Volume 37, Page 640, Deed Records of Wharton County, Texas. (Does not affect subject tract)

HORIZONTAL DATUM: NAD83/NSRS2007  
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 SYLVANUS CASTLEMAN SURVEY No. 5,  
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 WHARTON COUNTY, TEXAS

**LCRA**  
 ENERGY • WATER • COMMUNITY SERVICES  
 3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
 (512) 473-3200 www.lcra.org



EXHIBIT "B"

**BEING A 379.090 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12, JOHN McCROSKY SURVEY No 2, ABSTRACT No. 630, AND GULF, WESTERN TEXAS & PACIFIC RAILWAY COMPANY SURVEY No. 1, ABSTRACT No. 625, ALL IN WHARTON COUNTY, TEXAS, SAID 379.090 ACRE TRACT OF LAND BEING A PORTION OF BLOCK 48 AND BLOCK 69, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 379.090 ACRE TRACT OF LAND BEING ALL OF TRACT III, A 379.68 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM HENDERSON FARMS, INC. TO CARAVELAS COMPANY, N.V., EXECUTED JANUARY 3, 1977, RECORDED IN VOLUME 491, PAGE 186, D.R.W.C.T., SAID 379.090 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:**

**BEGINNING** at a 1-1/4 inch iron pipe found (Grid Coordinates N=9,694,960.06 US Feet, E=3,666,510.05 US Feet) for the southwest corner of said Tract III and for the northwest corner of First Tract, a 163.299 acre tract of land (by deed), described in deed from Oldrich J. Hlavinka and wife, Bessie Hlavinka to James J. Hlavinka and wife, Annette J. Hlavinka, executed August 23, 1977, recorded in Volume 486, Page 267, D.R.W.C.T., said 1-1/4 inch iron pipe being in the east line of a 188.90 acre tract of land (by deed), described in deed from John W. Williams and Kimberly J. Williams to Greg A. Koenig and Ronald C. Koenig, executed February 19, 2008, recorded in Volume 733, Page 743, O.R.W.C.T. and being in the east line of Block 71 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, said 1-1/4 inch iron pipe being the southwest corner of said Block 69 and also being the northwest corner of Block 68 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company;

**THENCE** North 30 degrees 16 minutes 31 seconds West, with the west line of said Tract III, with the east line of said 188.90 acre tract of land, with the west line of said Block 69, and with the east line of said Block 71, passing at a distance of 2743.74 feet a 5/8 inch iron rod with cap stamped "5319" found for reference, in all, a distance of 2772.97 feet to a calculated point for the northwest corner of said Tract III and for the northeast corner of said 188.90 acre tract of land, said calculated point being in the south line of a 277.33 acre tract of land (by deed), described in deed from F. D. Gavranovic to F. D. Gavranovic, Jr., executed October 29, 1997, recorded in Volume 255, Page 813 of the Official Records of Wharton County, Texas, (O.R.W.C.T.) and being in the approximate centerline of a 44 foot wide road dedication as shown on said Re-Subdivision of lands of Missouri-Lincoln Trust Company plat, currently known as County Road No. 116 (a/k/a Henry Road), said calculated point also being the common corner of said Block 69, said Block 71, Block 70 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, and Block 47 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, from which a 3/4 inch iron pipe found bears, North 30 degrees 16 minutes 31 seconds West, a distance of 0.75 feet;

**THENCE** North 59 degrees 50 minutes 29 seconds East, with the north line of said Tract III, with the south line of said 277.33 acre tract of land, with the north line of said Block 69, with the south line of said Block 47, with the north line of said Block 48, with the south line of Block 38 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, and with the approximate centerline of said 44 foot wide road currently known as County Road No. 116, passing the easterly line of said Sylvanus Castleman Survey No. 5 and the westerly line of said John McCrosky Survey No. 2, in all, a distance of 5667.22 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the northeast corner of said Tract III and for the southeast corner of said 277.33 acre tract of land, said 5/8 inch iron rod with cap stamped "GORRONDONA" also being in a westerly line of Tract No. 2, a 129.3 acre tract of land (by deed), described in deed from Gulf Coast Rice Farms, Inc. to Gulf Coast Water Company, executed February 20, 1952, recorded in Volume 249, Page 109, D.R.W.C.T. and also being in a westerly line of "Lane City Section" (by deed), described in deed from Gulf Coast Water Company to Lower Colorado River Authority, executed December 31, 1959, recorded in Volume 318, Page 396, D.R.W.C.T., from which a concrete monument with disc stamped "LCRA SURVEY MARK" found bears, North 40 degrees 57 minutes 08 seconds West, a distance of 30.70 feet;

**THENCE** South 42 degrees 10 minutes 59 seconds East, with an east line of said Tract III and with a westerly line of said 129.3 acre tract of land, a distance of 2168.28 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

**THENCE** South 30 degrees 31 minutes 49 seconds East, with an east line of said Tract III and with a westerly line of said 129.3 acre tract of land, a distance of 662.40 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the southeast corner of said Tract III and for the northeast corner of said First Tract, said 5/8 inch iron rod with cap stamped "GORRONDONA" being in the south line of said Block 48 and also being in the north line of Block 49 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company;

Wharton County, Texas  
Sylvanus Castleman Survey No. 5, Abstract No. 12  
John McCrosky Survey No. 2, Abstract No. 630  
Gulf, Western Texas & Pacific Railway Company Survey No. 1  
Abstract No. 625  
Lower Colorado River Authority

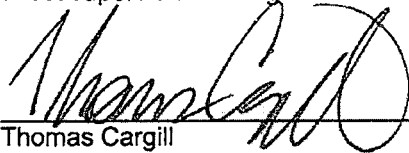
379.090 Acres  
Page 2 of 4

**THENCE** South 59 degrees 56 minutes 11 seconds West, with the south line of said Tract III, with the north line of said First Tract, with the south line of said Block 48, and with the north line of said Block 49, passing at a distance of 1166.61 feet, a 2 inch iron pipe (damaged) found for reference, continuing with the south line of said Tract III, the north line of said First Tract, the south line of said Block 48, the north line of said Block 49, with the south line of said Block 69, and with the north line of said Block 68, passing the west line of said Gulf, Western Texas & Pacific Railway Company Survey No. 1 and the east line of said Sylvanus Castleman Survey No. 5, in all, a distance of 6117.60 feet to the **POINT OF BEGINNING**, and containing 379.090 acres of land, more or less.

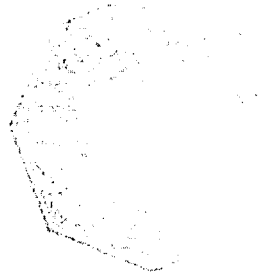
Bearing Basis: Texas Lambert Grid, Central Zone, NAD83/NSRS2007.

All distances are surface values and in U. S. Survey Feet. To compute grid values multiply surface distances by a Combined Scale Factor of 1.00037640.

The field notes and the plat attached hereto represent an on-the-ground survey made under my direct supervision during the months of September 2012 to October 2012.



Thomas Cargill  
Registered Professional Land Surveyor No. 5835  
Gorrondona and Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933



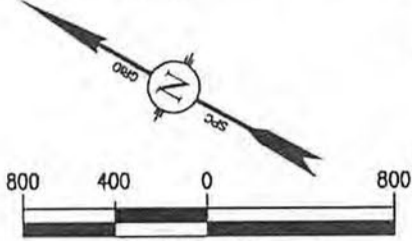
Word File: LCRAW114A-0003A.DOC  
Drawing File: LCRAW114A-0003A.DWG

WHARTON COUNTY, TEXAS

SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12  
 JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630  
 GULF, WESTERN TEXAS & PACIFIC RAILWAY COMPANY SURVEY No. 1,  
 ABSTRACT No. 625

TRACT No. 2 - 129.3 ACRES (BY DEED)  
 GULF COAST RICE FARMS, INC.  
 TO  
 GULF COAST WATER COMPANY  
 VOLUME 249, PAGE 109, D.R.W.C.T.  
 FEBRUARY 20, 1952  
 LANE CITY SECTION (BY DEED)  
 GULF COAST WATER COMPANY  
 TO  
 LOWER COLORADO RIVER AUTHORITY  
 VOLUME 318, PAGE 396, D.R.W.C.T.  
 DECEMBER 31, 1959

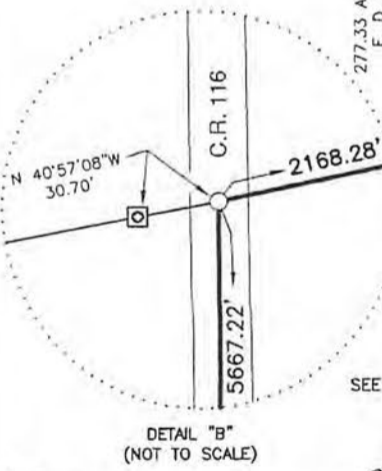
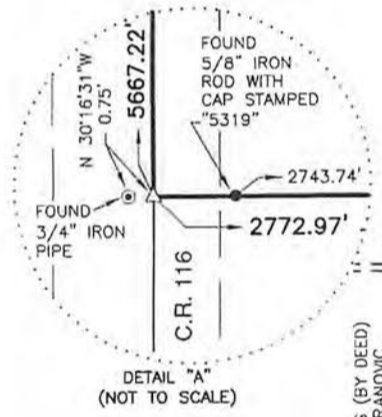
LINE TABLE		
LINE	BEARING	DISTANCE
L-1	S 30°31'49"E	662.40'



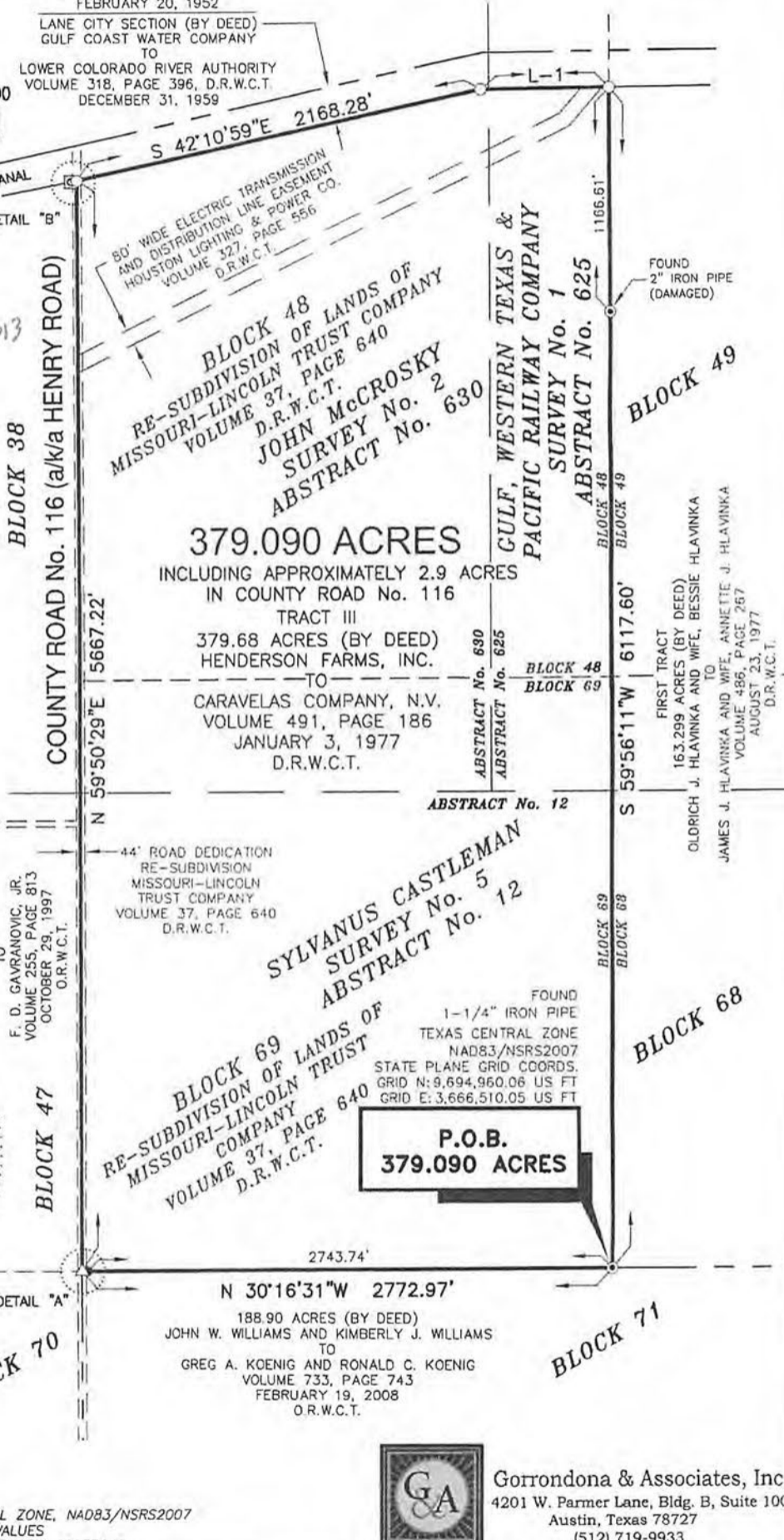
GRAPHIC SCALE

*[Handwritten Signature]*  
 1/16/2013  
**LEGEND**

- △ CALCULATED POINT
  - ⊙ IRON PIPE FOUND (SIZE NOTED)
  - IRON ROD FOUND (SIZE NOTED)
  - 5/8" IRON ROD WITH CAP STAMPED "GORRONDONA" SET
- D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS  
 O.R.W.C.T. OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS



NOTE:  
 SEE PAGE 4 FOR EASEMENT NOTES.



**379.090 ACRES**  
 INCLUDING APPROXIMATELY 2.9 ACRES  
 IN COUNTY ROAD No. 116  
 TRACT III  
 379.68 ACRES (BY DEED)  
 HENDERSON FARMS, INC.  
 TO  
 CARAVELAS COMPANY, N.V.  
 VOLUME 491, PAGE 186  
 JANUARY 3, 1977  
 D.R.W.C.T.

**P.O.B.**  
**379.090 ACRES**

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY 1.00037640.



Gorrondona & Associates, Inc.  
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 Austin, Texas 78727  
 (512) 719-9933

ACAD FILE: LCRAW114A-0003A.dwg  
 WORD FILE: LCRAW114A-0003A.doc  
 REVISION: N/A  
 SCALE: 1"=800'  
 DATE: 1/16/2013  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

379.090 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 5  
 ABSTRACT No. 12  
 JOHN McCROSKY SURVEY No. 2  
 ABSTRACT No. 630 AND  
 GULF, WESTERN TEXAS & PACIFIC  
 RAILWAY COMPANY SURVEY No. 1  
 ABSTRACT No. 625  
 WHARTON COUNTY, TEXAS





## WHARTON COUNTY, TEXAS

SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12  
JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630

ONLY THESE EASEMENTS LISTED IN LIMITED TITLE CERTIFICATE GF No. 2012-0904  
DATED AUGUST 31, 2012, BY FIRST AMERICAN TITLE INSURANCE COMPANY WERE EVALUATED  
FOR THIS SURVEY.  
NO OTHER EASEMENT RECORD RESEARCH WAS PERFORMED BY GORRONDONA & ASSOCIATES INC.

- 1/16/2013*
- c) Easement as shown in instrument from John Norris to Texas Pipeline Company, dated November 4, 1945 and filed in Volume 183, Page 290, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - d) Easement as shown in instrument from John Norris to George K. Taggart, dated March 19, 1946 and filed in Volume 186, Page 57, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - e) Easement as shown in instrument from John Norris to Texas Pipeline Co., dated August 28, 1946 and filed in Volume 188, Page 75, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - f) Easement as shown in instrument from Johnnie Hobbs, et al to Texas Pipeline Company, dated June 30, 1951 and filed in Volume 242, Page 181, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - g) Easement as shown in instrument from J.R. Cox to Texas Central Power Co., dated January 28, 1926 and filed in Volume 73, Page 193, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - h) Easement as shown in instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 276, Page 56, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - i) Easement as shown in instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 282, Page 450, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - j) Easement as shown in instrument from G.W. Townsend to Atlantic Refining Co., dated April 28, 1956 and filed in Volume 289, Page 486, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - k) Easement for electric transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated August 12, 1975 and filed in Volume 458, Page 382, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - l) Easement for electric transmission line as shown in instrument from Lois Ann Hecker to C.P. & L., dated June 16, 1955 and filed in Volume 282, Page 448, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - m) Pipeline easement as shown in instrument from J.B. Gary, Jr., et al to Texas Illinois Natural Gas Pipeline Company, dated August 8, 1950 and filed in Volume 230, Page 315, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - n) Pipeline easement as shown in instrument from J.B. Gary Estate to Humble Pipeline Company, dated December 13, 1951 and filed in Volume 245, Page 245, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - o) Pipeline easement as shown in instrument from J.B. Gary, Jr., Trustee to Humble Pipeline Co., dated February 13, 1967 and filed in Volume 381, Page 105, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - p) Pipeline easement as shown in instrument from Annie E. Taylor to Atlantic Oil Production Co., dated January 11, 1926 and filed in Volume 71, Page 388, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - q) Pipeline easement as shown in instrument from Annie E. Taylor to Atlantic Production Co., dated January 26, 1926 and filed in Volume 71, Page 490, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - r) Pipeline easement as shown in instrument from Annie E. Taylor to Sinclair Texas Pipeline Co., dated April 19, 1926 and filed in Volume 73, Page 462, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - s) Pipeline easement as shown in instrument from Annie E. Taylor to Humble Pipeline Co., dated March 21, 1926 and filed in Volume 74, Page 617, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - t) Easement for electrical transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated February 17, 1972 and filed in Volume 423, Page 409, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - u) Easement for electrical transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, Page 409, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - v) 10 ft. wide easement for electrical lines as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, Page 408, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - w) Easement for electric transmission line as shown in instrument from Ada Houston Cox to C.P. & L., dated May 12, 1955 and filed in Volume 284, Page 278, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - x) Easement for pipeline as shown in instrument from Ada Houston Cox to Sohio Petroleum Co., dated June 30, 1954 and filed in Volume 270, Page 565, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - y) Easement for electric transmission line as shown in instrument from J.R. Cox to Houston Lighting & Power Co., dated March 29, 1926 and filed in Volume 74, Page 222, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - z) Easement for electric transmission line as shown in instrument from Ada H. Cox to H.L. & P., dated March 2, 1961 and filed in Volume 347, Page 207, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - aa) Easement for electric transmission line as shown in instrument from T. Gordon, et al to Houston Lighting & Power Co., dated January 12, 1961 and filed in Volume 327, Page 556, Deed Records of Wharton County, Texas. (Does affect subject tract and is shown hereon)
  - bb) 22 ft. wide easement for road along Northwest line of subject property as shown by Plot of said Subdivision, filed in Volume 37, Page 640, Deed Records of Wharton County, Texas. (Does not affect subject tract)

HORIZONTAL DATUM: NAD83/NSRS2007  
VERTICAL DATUM: NAVD 88  
COMBINED SCALE FACTOR: 1.00037640  
BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.



Gorrondona & Associates, Inc.  
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(512) 719-9933

ACAD FILE: LCRAW114A-0003A.dwg  
WORD FILE: LCRAW114A-0003A.doc  
REVISION: N/A  
SCALE: 1"=800'  
DATE: 1/16/2013  
WO NO.: 72166  
FIELD BOOK: LCRA2  
DRAWN BY: R. Eckert

379.090 ACRE TRACT OUT OF  
SYLVANUS CASTLEMAN SURVEY No. 5  
ABSTRACT No. 12  
JOHN McCROSKY SURVEY No. 2  
ABSTRACT No. 630 AND  
GULF, WESTERN TEXAS & PACIFIC  
RAILWAY COMPANY SURVEY No. 1  
ABSTRACT No. 625  
WHARTON COUNTY, TEXAS

**LCRA**  
ENERGY • WATER • COMMUNITY SERVICES  
3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
(512) 473-3200 www.lcra.org

EXHIBIT "C"

**BEING A 189.492 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11, D. DAVIS & D. BAKER SURVEY, ABSTRACT No. 71, AND JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630, ALL IN WHARTON COUNTY, TEXAS, SAID 189.492 ACRE TRACT OF LAND BEING A PORTION OF BLOCK 38 AND BLOCK 39, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 189.492 ACRE TRACT OF LAND BEING ALL OF TRACT II, A 189.51 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM HENDERSON FARMS, INC., TO CARAVELAS COMPANY, N.V., EXECUTED JANUARY 3, 1977, RECORDED IN VOLUME 491, PAGE 186, D.R.W.C.T., SAID 189.492 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:**

**BEGINNING** at a 3/4 inch iron pipe found (Grid Coordinates N=9,701,393.35 US Feet, E=3,665,712.17 US Feet) for the northwest corner of said Tract II, being in the southeast line of a 17.9 acre tract of land (by deed), described in deed from Gulf Coast Water Company to County of Wharton, Texas, executed June 28, 1939, recorded in Volume 139, Page 608, D.R.W.C.T., said 3/4 inch iron pipe being in the east line of Tract No. 2, a 129.3 acre tract of land (by deed), described in deed from Gulf Coast Rice Farms, Inc. to Gulf Coast Water Company, executed February 20, 1952, recorded in Volume 249, Page 109, D.R.W.C.T. and also being in the east line of "Lane City Section" (by deed), described in deed from Gulf Coast Water Company to Lower Colorado River Authority, executed December 31, 1959, recorded in Volume 318, Page 396, D.R.W.C.T.;

**THENCE** North 59 degrees 38 minutes 52 seconds East, with the northwest line of said Tract II and with the southeast line of said 17.9 acre tract of land, passing the east line of said Sylvanus Castleman Survey No. 4 and the west line of said D. Davis & D. Baker Survey, in all, a distance of 5300.00 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the northeast corner of said Tract II, in the curving westerly right-of-way line of State Highway No. 60 (100 foot wide right-of-way);

**THENCE**, with a northeast line of said Tract II and with the southwest right-of-way line of State Highway No. 60, along a curve to the left, an arc length of 808.05 feet, having a radius of 5779.58 feet, a central angle of 8 degrees 00 minutes 38 seconds, and whose chord bears, South 26 degrees 14 minutes 20 seconds East, a distance of 807.39 feet, to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for point of tangency in the northeast line of said Tract II and a point of tangency in the southwest right-of-way line of State Highway No. 60;

**THENCE** South 30 degrees 14 minutes 39 seconds East, with a northeast line of said Tract II and with the southwest right-of-way line of State Highway No. 60, passing the southeast line of said Block 39 and the northwest line of said Block 38, in all, a distance of 870.18 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the southeast corner of said Tract II and for the northeast corner of a 75.42 acre tract of land (by deed), described in deed from Dorothy Mae Wishert Ziober, Peggy Jo Jones, Carol Jean Wootton, Gregory Lynn Ziober, Kenneth Max Ziober, Susan Kay Olday, Nancy Carol Johnson, Donald Mark Meek, David R. Meek, Marion Ziober, Beverly Backstrom, Mary Clark, Alvin Frank Ziober, John David Ziober, Jane Ann Ziober Schnieder, Joe D. King, Frank John Ziober, Lucille Helen Ziober Jurek, and Betty Jean Ziober Shoppa to F. Daniel Gavranovic, and spouse, Gladys R. Gavranovic; F. D. Gavranovic and spouse, Meta Gavranovic, executed April 4, 2012, recorded in Volume 883, Page 850 of the Official Records of Wharton County, Texas (O.R.W.C.T.);

**THENCE** South 60 degrees 09 minutes 38 seconds West, with a southeast line of said Tract II and with a northwest line of said 75.42 acre tract of land, a distance of 573.01 feet to a 5/8 inch iron rod with cap stamped "5319" found for an exterior ell corner of said Tract II and for an interior ell corner of said 75.42 acre tract of land;

**THENCE** North 61 degrees 57 minutes 52 seconds West, with an interior line of said Tract II and with an interior line of said 75.42 acre tract of land, a distance of 74.50 feet to a 1/2 inch iron rod found for an interior ell corner of said Tract II and for an exterior ell corner of said 75.42 acre tract of land;

**THENCE** South 59 degrees 32 minutes 08 seconds West, with a southeast line of said Tract II and with a northwest line of said 75.42 acre tract of land, passing the westerly line of said D. Davis & D. Baker Survey and the easterly line of said John McCrosky Survey No. 2, in all, a distance of 1801.22 feet to a 5/8 inch iron rod with cap stamped "5319" found for an exterior ell corner of said Tract II and for the northwest corner of said 75.42 acre tract of land, said 5/8 inch iron rod with cap stamped "5319" being in a northerly line of said 129.3 acre tract of land and also being in a northerly line of said "Lane City Section";

**THENCE**, with the curving southeast line of said Tract II, with the curving northerly line of said 129.3 acre tract of land, and with the curving northerly line of said "Lane City Section", along a curve to the left, an arc length of 272.85 feet, having a radius of 458.00 feet, a central angle of 34 degrees 07 minutes 59 seconds, and whose chord bears, South 76 degrees 43 minutes 23 seconds West, a distance of 268.83 feet to a concrete monument with disc stamped "LCRA SURVEY MARK" found for the point of tangency of a southeast line of said Tract II and for the point of tangency of a northerly line of said 129.3 acre tract of land, said concrete monument with disc stamped "LCRA SURVEY MARK" also being a point of tangency of a northerly line of said "Lane City Section";

**THENCE** South 59 degrees 39 minutes 24 seconds West, with a southeast line of said Tract II, with a northerly line of said 129.3 acre tract of land, and with a northerly line of said "Lane City Section", a distance of 2263.17 feet to a calculated point in water for the southerly southwest corner of said Tract II and for an interior corner of said 129.3 acre tract of land, said calculated point in water also being an interior corner of said "Lane City Section";

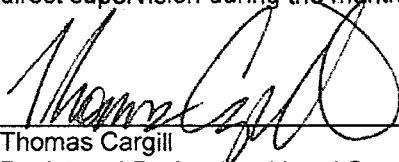
**THENCE**, with a southwest line of said Tract II, with an interior line of said 129.3 acre tract of land, and with an interior line of said "Lane City Section", passing the northwest line of said Block 38 and the southeast line of said Block 39, along a curve to the right, an arc length of 483.98 feet, having a radius of 308.00 feet, a central angle of 90 degrees 02 minutes 00 seconds, and whose chord bears, North 75 degrees 19 minutes 36 seconds West, a distance of 435.70 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the westerly southwest corner of said Tract II and for an interior corner of said 129.3 acre tract of land, said 5/8 inch iron rod with cap stamped "GORRONDONA" also being an interior corner of said "Lane City Section";

**THENCE** North 30 degrees 18 minutes 36 seconds West, with a southwest line of said Tract II, with an easterly line of said 129.3 acre tract of land, and with an easterly line of said "Lane City Section", passing the north line of said John McCrosky Survey No. 2 and the south line of said Sylvanus Castleman Survey No. 4, in all, a distance of 1222.95 feet to the **POINT OF BEGINNING**, and containing 189.492 acres of land, more or less.

Bearing Basis: Texas Lambert Grid, Central Zone, NAD83/NSRS2007.

All distances are surface values and in U. S. Survey Feet. To compute grid values multiply surface distances by a Combined Scale Factor of 1.00037640.

The field notes and the plat attached hereto represent an on-the-ground survey made under my direct supervision during the months of September 2012 to November 2012.

  
\_\_\_\_\_  
Thomas Cargill  
Registered Professional Land Surveyor No. 5835  
Gorrondona and Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933



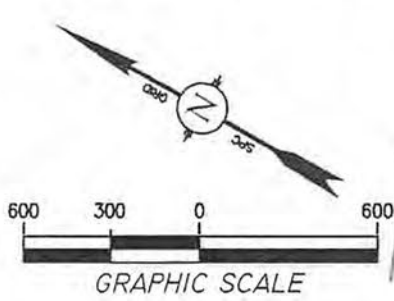
Word File: LCRAW114A-0001A.DOC  
Drawing File: LCRAW114A-0001A.DWG



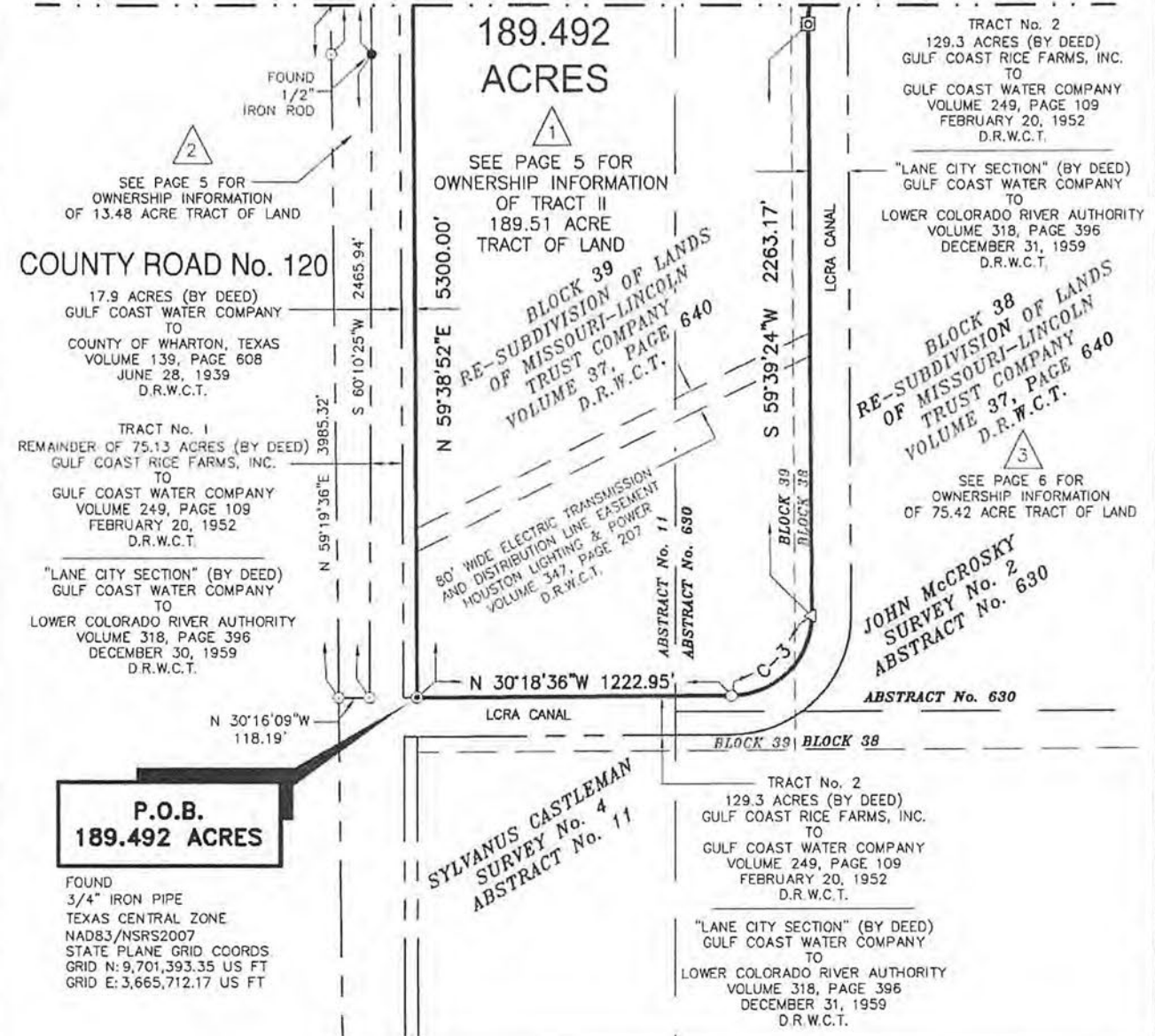
WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11  
 D. DAVIS & D. BAKER SURVEY, ABSTRACT No. 71  
 JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630

LEGEND

- △ CALCULATED POINT
  - ⊗ "LCRA" CONCRETE MONUMENT FOUND
  - ⊙ IRON ROD WITH CAP STAMPED "CLARK SURVEYING 1881" FOUND
  - ⊙ IRON PIPE FOUND (SIZE NOTED)
  - IRON ROD FOUND (SIZE NOTED)
  - 5/8" IRON ROD WITH CAP STAMPED "GORRONDONA" SET
- D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS  
 O.R.W.C.T. OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS



MATCHLINE PAGE 4



**P.O.B.**  
**189.492 ACRES**

FOUND  
 3/4" IRON PIPE  
 TEXAS CENTRAL ZONE  
 NAD83/NSRS2007  
 STATE PLANE GRID COORDS  
 GRID N: 9,701,393.35 US FT  
 GRID E: 3,665,712.17 US FT

CURVE TABLE					
CURVE	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH	ARC LENGTH
C-3	308.00'	90°02'00"	N 75°19'36"W	435.70'	483.98'

NOTES:  
 1) SEE PAGE 5 FOR OWNERSHIP INFORMATION.  
 2) SEE PAGE 6 FOR EASEMENT NOTES.

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.



Gorrondona & Associates, Inc.  
 4201 W. Parmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 719-9933

ACAD FILE: LCRAW114A-0001A.dwg  
 WORD FILE: LCRAW114A-0001A.doc  
 REVISION: 1  
 SCALE: 1"=600'  
 DATE: 1/15/2013  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

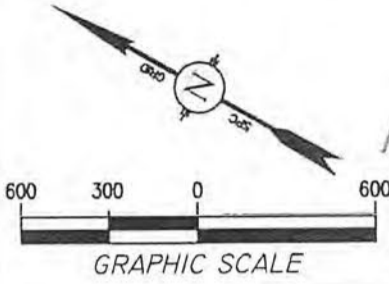
189.492 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 4  
 ABSTRACT No. 11  
 D. DAVIS & D. BAKER SURVEY  
 ABSTRACT No. 71  
 AND JOHN McCROSKY SURVEY No. 2  
 ABSTRACT No. 630  
 WHARTON COUNTY, TEXAS



WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11  
 D. DAVIS & D. BAKER SURVEY, ABSTRACT No. 71  
 JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630

LEGEND

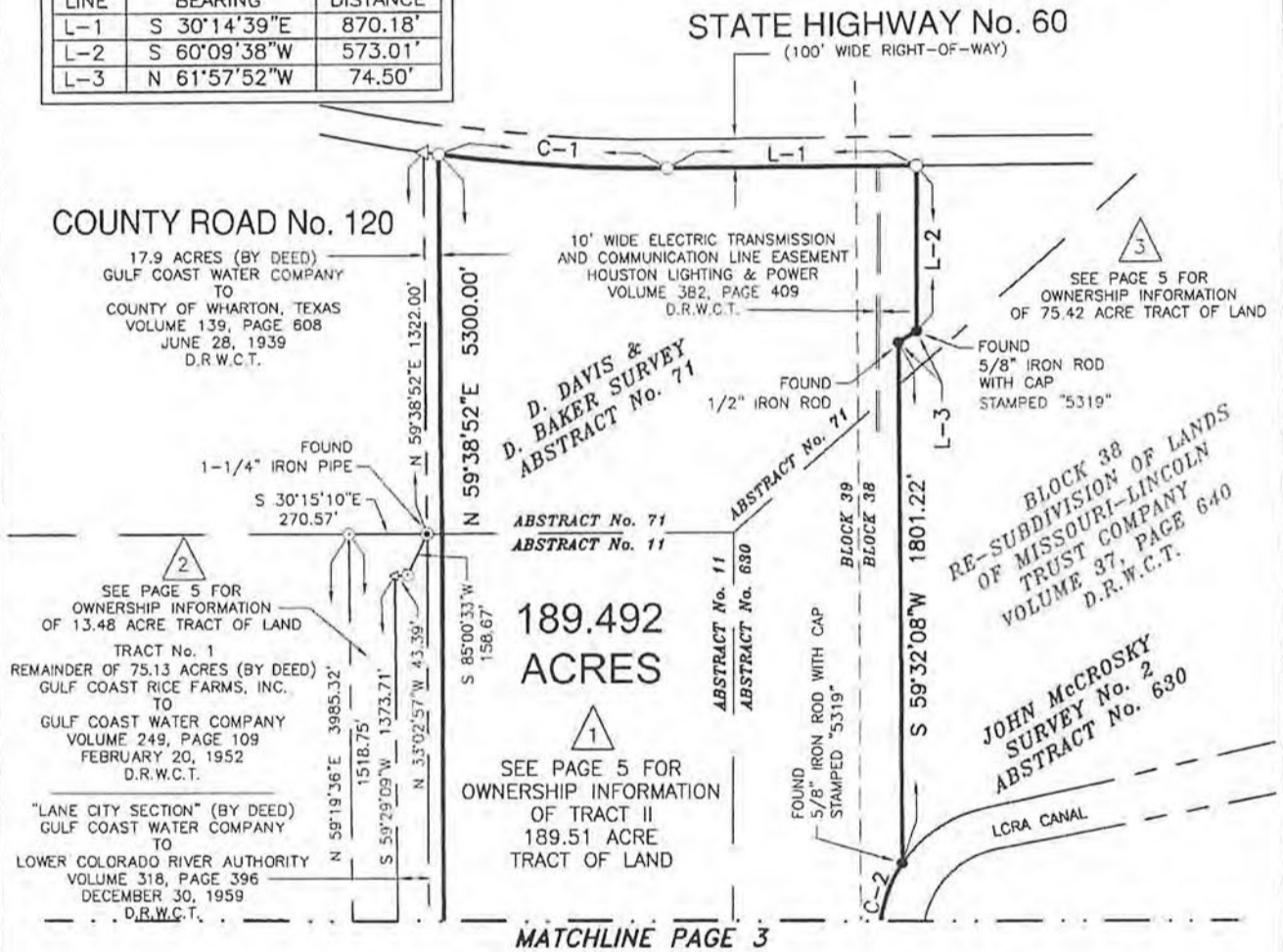
- △ CALCULATED POINT
  - IRON ROD WITH CAP
  - ⊙ STAMPED "CLARK SURVEYING 1881" FOUND
  - ⊙ IRON PIPE FOUND (SIZE NOTED)
  - IRON ROD FOUND (SIZE NOTED)
  - 5/8" IRON ROD WITH CAP STAMPED "GORRONDONA" SET
- D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS



*[Handwritten signature]*  
 1/15/2013

CURVE TABLE					
CURVE	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH	ARC LENGTH
C-1	5779.58'	8°00'38"	S 26°14'20"E	807.39'	808.05'
C-2	458.00'	34°07'59"	S 76°43'23"W	268.83'	272.85'

LINE TABLE		
LINE	BEARING	DISTANCE
L-1	S 30°14'39"E	870.18'
L-2	S 60°09'38"W	573.01'
L-3	N 61°57'52"W	74.50'



NOTES:  
 1) SEE PAGE 5 FOR OWNERSHIP INFORMATION.  
 2) SEE PAGE 6 FOR EASEMENT NOTES.

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.

Gorrondona & Associates, Inc.  
 4201 W. Parmer Lane, Bldg B, Suite 100  
 Austin, Texas 78727  
 (512) 719-9933

ACAD FILE: LCRAW114A-0001A.dwg  
 WORD FILE: LCRAW114A-0001A.doc  
 REVISION: 1  
 SCALE: 1"=600'  
 DATE: 1/15/2013  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

189.492 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 4  
 ABSTRACT No. 11  
 D. DAVIS & D. BAKER SURVEY  
 ABSTRACT No. 71  
 AND JOHN McCROSKY SURVEY No. 2  
 ABSTRACT No. 630  
 WHARTON COUNTY, TEXAS

ENERGY • WATER • COMMUNITY SERVICES  
 3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
 (512) 473-3200 www.lcra.org



WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11  
 D. DAVIS & D. BAKER SURVEY, ABSTRACT No. 71  
 JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630

LEGEND

D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS  
 O.R.W.C.T. OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS



TRACT II  
 189.51 ACRES (BY DEED)  
 HENDERSON FARMS, INC.  
 TO  
 CARAVELAS COMPANY, N.V.  
 VOLUME 491, PAGE 186  
 JANUARY 3, 1977  
 D.R.W.C.T.



TRACT D  
 13.48 ACRES (BY DEED)  
 VIVYEN BEARD NELSON FAMILY LIMITED PARTNERSHIP, ACTING BY AND  
 THROUGH RICHARD CHARLES GEISLER, SR., SOLE SURVIVING GENERAL PARTNER  
 TO  
 F. D. GAVRANOVIC AND META GAVRANOVIC, HUSBAND AND WIFE AND DANIEL GAVRANOVIC AND  
 GLADYS GAVRANOVIC, HUSBAND AND WIFE  
 VOLUME 791, PAGE 312  
 AUGUST 12, 2009  
 O.R.W.C.T.



75.42 ACRES (BY DEED)  
 DOROTHY MAE WISHERT ZIOBER, PEGGY JO JONES, CAROL JEAN WOOTTON,  
 GREGORY LYNN ZIOBER, KENNETH MAX ZIOBER, SUSAN KAY OLDAY,  
 NANCY CAROL JOHNSON, DONALD MARK MEEK, DAVID R. MEEK,  
 MARION ZIOBER, BEVERLY BACKSTROM, MARY CLARK, ALVIN FRANK ZIOBER,  
 JOHN DAVID ZIOBER, JANE ANN ZIOBER SCHNIEDER, JOE D. KING,  
 FRANK JOHN ZIOBER, LUCILLE HELEN ZIOBER JUREK,  
 AND BETTY JEAN ZIOBER SHOPPA  
 TO  
 F. DANIEL GAVRANOVIC, AND SPOUSE, GLADYS R. GAVRANOVIC;  
 F. D. GAVRANOVIC, AND SPOUSE META GAVRANOVIC  
 VOLUME 883, PAGE 850  
 APRIL 4, 2012  
 O.R.W.C.T.

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.



Gorrondona & Associates, Inc.  
 4201 W. Parmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 719-9933

ACAD FILE: LCRAW114A-0001A.dwg  
 WORD FILE: LCRAW114A-0001A.doc  
 REVISION: 1  
 SCALE: 1"=600'  
 DATE: 1/15/2013  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

189.492 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 4  
 ABSTRACT No. 11  
 D. DAVIS & D. BAKER SURVEY  
 ABSTRACT No. 71  
 AND JOHN McCROSKY SURVEY No. 2  
 ABSTRACT No. 630  
 WHARTON COUNTY, TEXAS



## WHARTON COUNTY, TEXAS

SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11

D. DAVIS &amp; D. BAKER SURVEY, ABSTRACT No. 71

JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630

ONLY THESE EASEMENTS LISTED IN LIMITED TITLE CERTIFICATE GF No. 2012-0904  
DATED AUGUST 31, 2012, BY FIRST AMERICAN TITLE INSURANCE COMPANY WERE EVALUATED  
FOR THIS SURVEY.  
NO OTHER EASEMENT RECORD RESEARCH WAS PERFORMED BY GORRONDONA & ASSOCIATES INC.

- 1/15/2013*
- c) Easement as shown in instrument from John Harris to Texas Pipeline Company, dated November 4, 1945 and filed in Volume 183, Page 290, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - d) Easement as shown in instrument from John Harris to George K. Taggart, dated March 19, 1946 and filed in Volume 185, Page 57, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - e) Easement as shown in instrument from John Harris to Texas Pipeline Co., dated August 28, 1946 and filed in Volume 188, Page 75, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - f) Easement as shown in instrument from Johnnie Hobbs, et al to Texas Pipeline Company, dated June 30, 1951 and filed in Volume 242, Page 181, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - g) Easement as shown in instrument from J.R. Cox to Texas Central Power Co., dated January 28, 1926 and file in Volume 73, Page 193, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, blanket in nature)
  - h) Easement as shown in Instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 276, Page 56, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - i) Easement as shown in instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 282, Page 450, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - j) Easement as shown in instrument from G.W. Townsend to Atlantic Refining Co., dated April 28, 1956 and filed in Volume 289, Page 486, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - k) Easement for electric transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated August 12, 1975 and filed in Volume 458, Page 382, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - l) Easement for electric transmission line as shown in instrument from Lois Ann Hecker to C.P. & L., dated June 16, 1955 and filed in Volume 282, Page 448, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - m) Pipeline easement as shown in instrument from J.B. Gary, Jr., et al to Texas Illinois Natural Gas Pipeline Company, dated August 8, 1950 and filed in Volume 230, Page 315, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - n) Pipeline easement as shown in instrument from J.B. Gary Estate to Humble Pipeline Company, dated December 13, 1951 and filed in Volume 245, Page 245, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - o) Pipeline easement as shown in instrument form J.B. Gary, Jr., Trustee to Jumble Pipeline Co., dated February 13, 1967 and filed in Volume 381, Page 105, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - p) Pipeline easement as shown in instrument from Annie E. Taylor to Atlantic Oil Production Co., dated January 11, 1926 and filed in Volume 71, Page 388, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - q) Pipeline easement as shown in instrument from Annie E. Taylor to Atlantic Production Co., dated January 26, 1926 and filed in Volume 71, Page 490, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - r) Pipeline easement as shown in instrument from Annie E. Taylor to Sinclair Texas Pipeline Co., dated April 19, 1926 and filed in Volume 73, Page 462, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - s) Pipeline easement as shown in instrument from Annie E. Taylor to Humble Pipeline Co., dated March 21, 1926 and filed in Volume 74, Page 617, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - t) Easement for electrical transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated February 17, 1972 and filed in Volume 423, Page 409, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - u) Easement for electrical transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, Page 409, Deed Records of Wharton County, Texas. (Does affect subject tract and is shown hereon)
  - v) 10 ft. wide easement for electrical lines as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, Page 408, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - w) Easement for electric transmission line as shown in instrument from Ada Houston Cox to C. P. & L., dated May 12, 1955 and filed in Volume 284, Page 278, Deed Records of Wharton County, Texas. (Does affect subject tract, unable to plot, blanket in nature)
  - x) Easement for pipeline as shown in instrument from Ada Houston Cox to Sohio Petroleum Co., dated June 30, 1954 and filed in Volume 270, Page 565, Deed Records of Wharton County, Texas. (Does affect subject tract, unable to plot, blanket in nature)
  - y) Easement for electric transmission line as shown in instrument from J.R. Cox to Houston Lighting & Power Co., dated March 29, 1926 and filed in Volume 74, Page 222, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, blanket in nature)
  - z) Easement for electric transmission line as shown in instrument from Ada H. Cox to H. L. & P., dated March 2, 1961 and filed in Volume 347, Page 207, Deed Records of Wharton County, Texas. (Does affect subject tract and is shown hereon)
  - aa) Easement for electric transmission line as shown in instrument from T. Gordon, et al to Houston Lighting & Power Co., dated January 12, 1961 and filed in Volume 327, Page 556, Deed Records of Wharton County, Texas. (Does not affect subject tract)
  - bb) 22 ft. wide easement for road along Northwest line of subject property as shown by Plat of said Subdivision, filed in Volume 37, Page 640, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, illegible plat)

HORIZONTAL DATUM: NAD83/NSRS2007  
VERTICAL DATUM: NAVD 88  
COMBINED SCALE FACTOR: 1.00037640  
BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.



Gorrondona & Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933

ACAD FILE: LCRAW114A-0001A.dwg  
WORD FILE: LCRAW114A-0001A.doc  
REVISION: 1  
SCALE: 1"=600'  
DATE: 1/15/2013  
WO NO.: 72166  
FIELD BOOK: LCRA2  
DRAWN BY: R. Eckert

189.492 ACRE TRACT OUT OF  
SYLVANUS CASTLEMAN SURVEY No. 4  
ABSTRACT No. 11  
D. DAVIS & D. BAKER SURVEY  
ABSTRACT No. 71  
AND JOHN McCROSKY SURVEY No. 2  
ABSTRACT No. 630  
WHARTON COUNTY, TEXAS

**LCRA**  
ENERGY • WATER • COMMUNITY SERVICES  
3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
(512) 473-3200 www.lcra.org



EXHIBIT "D"

**TRACT 1**

**DESCRIPTION FOR A 5.000 ACRE TRACT OF LAND SITUATED IN D. DAVIS & D. BAKER SURVEY, ABSTRACT No. 71, IN WHARTON COUNTY, TEXAS, SAID 5.000 ACRE TRACT OF LAND BEING A PORTION OF BLOCK 39, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 5.000 ACRE TRACT OF LAND BEING A PORTION OF TRACT II, A 189.492 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM HENDERSON FARMS, INC. TO CARAVELAS COMPANY, N.V., EXECUTED JANUARY 3, 1977, RECORDED IN VOLUME 491, PAGE 186, D.R.W.C.T., SAID 5.000 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:**

**BEGINNING** at a 5/8 inch iron rod with cap stamped "GORRONDONA" found (Grid Coordinates N=9,704,072.51 US Feet, E=3,670,287.45 US Feet) for the north corner of said Tract II in the curving westerly right-of-way line of State Highway No. 60 (100 foot wide right-of-way) and being in the southeast line of a 17.9 acre tract of land (by deed) currently known as County Road No. 120, described in deed from Gulf Coast Water Company to County of Wharton, Texas, executed June 28, 1939, recorded in Volume 139, Page 608, D.R.W.C.T, from which a 3/4 inch iron pipe found for the west corner of said Tract II and being in the southeast line of said 17.9 acre tract of land, bears, South 59 degrees 38 minutes 52 seconds West, a distance of 5300.00 feet, said 3/4 inch iron pipe being in the east line of Tract No. 2, a 129.3 acre tract of land (by deed), described in deed from Gulf Coast Rice Farms, Inc. to Gulf Coast Water Company, executed February 20, 1952, recorded in Volume 249, Page 109, D.R.W.C.T. and also being in the east line of "Lane City Section" (by deed), described in deed from Gulf Coast Water Company to Lower Colorado River Authority, executed December 31, 1959, recorded in Volume 318, Page 396, D.R.W.C.T.;

**THENCE**, with the curving northeast line of said Tract II with the curving southwest right-of-way line of State Highway No. 60, and with a curve to the left, an arc length of 448.73 feet, having a radius of 5779.58 feet, a central angle of 4 degrees 26 minutes 55 seconds, and whose chord bears South 24 degrees 27 minutes 28 seconds East, a distance of 448.62 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner, from which a 5/8 inch iron rod with cap stamped "GORRONDONA" found for a point of tangency in the curving northeast line of said Tract II and a point of tangency in the curving southwest right-of-way line of State Highway No. 60, bears, along a curve to the left, an arc length of 359.31 feet, having a radius of 5779.58 feet, a central angle of 3 degrees 33 minutes 43 seconds, and whose chord bears South 28 degrees 27 minutes 47 seconds East, a distance of 359.25 feet;

**THENCE** South 59 degrees 38 minutes 52 seconds West, a distance of 467.96 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

**THENCE** North 30 degrees 21 minutes 08 seconds West, a distance of 446.25 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner in the northwest line of said Tract II and in the southeast line of said 17.9 acre tract of land;

**THENCE** North 59 degrees 38 minutes 52 seconds East, with the northwest line of said Tract II and with the southeast line of said 17.9 acre tract of land, a distance of 514.03 feet to the **POINT OF BEGINNING**, and containing 5.000 acres of land, more or less.



**TRACT 2**

**DESCRIPTION FOR A 5.000 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11, IN WHARTON COUNTY, TEXAS, SAID 5.000 ACRE TRACT OF LAND BEING A PORTION OF BLOCK 39, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 5.000 ACRE TRACT OF LAND BEING A PORTION OF TRACT II, A 189.492 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM HENDERSON FARMS, INC. TO CARAVELAS COMPANY, N.V., EXECUTED JANUARY 3, 1977, RECORDED IN VOLUME 491, PAGE 186, D.R.W.C.T., SAID 5.000 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:**

**BEGINNING** at a 5/8 inch iron rod with cap stamped "GORRONDONA" set (Grid Coordinates N=9,703,209.48 US Feet, E=3,668,813.63 US Feet) for corner in the northwest line of said Tract II and being in the southeast line of a 17.9 acre tract of land (by deed), currently known as County Road No. 120, described in deed from Gulf Coast Water Company to County of Wharton, Texas, executed June 28, 1939, recorded in Volume 139, Page 608, D.R.W.C.T., from which a 5/8 inch iron rod with cap stamped "GORRONDONA" found for the north corner of said Tract II, in the curving westerly right-of-way line of State Highway No. 60 (100 foot wide right-of-way), bears, North 59 degrees 38 minutes 52 seconds East, a distance of 1707.27 feet;

**THENCE** South 30 degrees 21 minutes 08 seconds East, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

**THENCE** South 59 degrees 38 minutes 52 seconds West, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

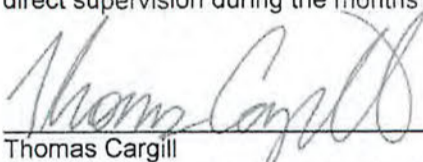
**THENCE** North 30 degrees 21 minutes 08 seconds West, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner in the northwest line of said Tract II and in the southeast line of said 17.9 acre tract of land, from which a 3/4 inch iron pipe found for the west corner of said Tract II and being in the southeast line of said 17.9 acre tract of land, bears, South 59 degrees 38 minutes 52 seconds West, a distance of 3126.04 feet, said 3/4 inch iron pipe being in the east line of Tract No. 2, a 129.3 acre tract of land (by deed), described in deed from Gulf Coast Rice Farms, Inc. to Gulf Coast Water Company, executed February 20, 1952, recorded in Volume 249, Page 109, D.R.W.C.T. and also being in the east line of "Lane City Section" (by deed), described in deed from Gulf Coast Water Company to Lower Colorado River Authority, executed December 31, 1959, recorded in Volume 318, Page 396, D.R.W.C.T.;

**THENCE** North 59 degrees 38 minutes 52 seconds East, with the northwest line of said Tract II and with the southeast line of said 17.9 acre tract of land, a distance of 466.69 feet to the **POINT OF BEGINNING**, and containing 5.000 acres of land, more or less.

Bearing Basis: Texas Lambert Grid, Central Zone, NAD83/NSRS2007.

All distances are surface values and in U. S. Survey Feet. To compute grid values multiply surface distances by a Combined Scale Factor of 1.00037640.

The field notes and the plat attached hereto represent an on-the-ground survey made under my direct supervision during the months of March 2013 to April 2013.

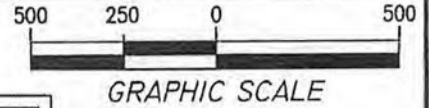
  
Thomas Cargill  
Registered Professional Land Surveyor No. 5835  
Gorrondona and Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933



Word File: LCRAW114A-0008A.DOC  
Drawing File: LCRAW114A-0008A.DWG

WHARTON COUNTY, TEXAS

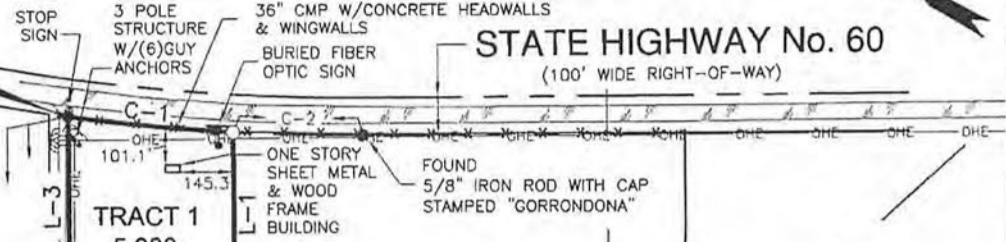
D. DAVID & D. BAKER SURVEY ABSTRACT No. 71  
 SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11



CURVE TABLE					
CURVE	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH	ARC LENGTH
C-1	5779.58'	4°26'55"	S 24°27'28"E	448.62'	448.73'
C-2	5779.58'	3°33'43"	S 28°27'47"E	359.25'	359.31'

**P.O.B.  
TRACT 1  
5.000 ACRES**

FOUND  
5/8" IRON ROD WITH CAP  
"GORRONDONA" TEXAS CENTRAL ZONE  
NAD83/NSRS2007  
STATE PLANE GRID COORDS.  
GRID N: 9,704,072.51 US FT  
GRID E: 3,670,287.45 US FT



**COUNTY ROAD No. 120**  
 17.9 ACRES (BY DEED)  
 GULF COAST WATER COMPANY  
 TO  
 COUNTY OF WHARTON, TEXAS  
 VOLUME 139, PAGE 608  
 JUNE 28, 1939  
 D.R.W.C.T.

**P.O.B.  
TRACT 2  
5.000 ACRES**

SET  
5/8" IRON ROD WITH CAP  
STAMPED "GORRONDONA"  
TEXAS CENTRAL ZONE  
NAD83/NSRS2007  
STATE PLANE GRID COORDS.  
GRID N: 9,703,209.48 US FT  
GRID E: 3,668,813.63 US FT

**D. DAVIS & D. BAKER SURVEY  
ABSTRACT No. 71**

**TRACT II  
189.492 ACRES (BY DEED)  
HENDERSON FARMS, INC.  
TO  
CARAVELAS COMPANY, N.V.  
VOLUME 491, PAGE 186  
JANUARY 3, 1977  
D.R.W.C.T.**

LINE TABLE		
LINE	BEARING	DISTANCE
L-1	S 59°38'52"W	467.96'
L-2	N 30°21'08"W	446.25'
L-3	N 59°38'52"E	514.03'
L-4	S 30°21'08"E	466.69'
L-5	S 59°38'52"W	466.69'
L-6	N 30°21'08"W	466.69'
L-7	N 59°38'52"E	466.69'

**SYLVANUS CASTLEMAN  
SURVEY No. 4  
ABSTRACT No. 11**

**BLOCK 39  
RE-SUBDIVISION OF LANDS  
OF MISSOURI-LINCOLN  
TRUST COMPANY  
VOLUME 37, PAGE 640  
D.R.W.C.T.**

**TRACT No. 2  
129.3 ACRES (BY DEED)  
GULF COAST RICE FARMS, INC.  
TO  
GULF COAST WATER COMPANY  
VOLUME 249, PAGE 109  
FEBRUARY 20, 1952  
D.R.W.C.T.**

**"LANE CITY SECTION" (BY DEED)  
GULF COAST WATER COMPANY  
TO  
LOWER COLORADO RIVER AUTHORITY  
VOLUME 318, PAGE 396  
DECEMBER 31, 1959  
D.R.W.C.T.**



- LEGEND**
- IRON PIPE FOUND (SIZE NOTED)
  - IRON ROD FOUND (SIZE NOTED)
  - 5/8" IRON ROD WITH CAP STAMPED "GORRONDONA" SET
  - H-FRAME ELECTRIC TRANSMISSION TOWER
  - D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS

**NOTES:**  
 1) SEE PAGE 3 FOR EASEMENT NOTES.  
 HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.



**Gorrondona & Associates, Inc.**  
 4201 W. Parmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 719-9933

ACAD FILE: LCRAW114A-0008A.dwg  
 WORD FILE: LCRAW114A-0008A.doc  
 REVISION: 1  
 SCALE: 1"=500'  
 DATE: 4/29/2013  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

A 5.000 ACRE TRACT OUT OF  
 D. DAVIS & D. BAKER SURVEY  
 ABSTRACT No. 71  
 AND  
 A 5.000 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 4  
 ABSTRACT No. 11  
 WHARTON COUNTY, TEXAS





## WHARTON COUNTY, TEXAS

D. DAVID &amp; D. BAKER SURVEY ABSTRACT No. 71

SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11

ONLY THESE EASEMENTS LISTED IN LIMITED TITLE CERTIFICATE GF No. 2012-0904 DATED AUGUST 31, 2012, BY FIRST AMERICAN TITLE INSURANCE COMPANY WERE EVALUATED FOR THIS SURVEY.  
NO OTHER EASEMENT RECORD RESEARCH WAS PERFORMED BY GORRONDONA & ASSOCIATES INC.

- c) Easement as shown in instrument from John Norris to Texas Pipeline Company, dated November 4, 1945 and filed in Volume 183, Page 290, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- d) Easement as shown in instrument from John Norris to George K. Taggart, dated March 19, 1946 and filed in Volume 186, Page 57, Deed Records of Wharton County, Texas. (Does not affect subject tract)
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- h) Easement as shown in instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 276, Page 56, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- i) Easement as shown in instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 282, Page 450, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- j) Easement as shown in instrument from G.W. Townsend to Atlantic Refining Co., dated April 28, 1956 and filed in Volume 289, Page 486, Deed Records of Wharton County, Texas. (Does not affect subject tract)
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- m) Pipeline easement as shown in instrument from J.B. Gary, Jr., et al to Texas Illinois Natural Gas Pipeline Company, dated August 8, 1950 and filed in Volume 230, Page 315, Deed Records of Wharton County, Texas. (Does not affect subject tract)
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- p) Pipeline easement as shown in instrument from Annie E. Taylor to Atlantic Oil Production Co., dated January 11, 1926 and filed in Volume 71, Page 388, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- q) Pipeline easement as shown in instrument from Annie E. Taylor to Atlantic Production Co., dated January 26, 1926 and filed in Volume 71, Page 490, Deed Records of Wharton County, Texas. (Does not affect subject tract)
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- u) Easement for electrical transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, Page 409, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- v) 10 ft. wide easement for electrical lines as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, Page 408, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- w) Easement for electric transmission line as shown in instrument from Ada Houston Cox to C. P. & L., dated May 12, 1955 and filed in Volume 284, Page 278, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- x) Easement for pipeline as shown in instrument from Ada Houston Cox to Sohio Petroleum Co., dated June 30, 1954 and filed in Volume 270, Page 565, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- y) Easement for electric transmission line as shown in instrument from J.R. Cox to Houston Lighting & Power Co., dated March 29, 1926 and filed in Volume 74, Page 222, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, blanket in nature)
- z) Easement for electric transmission line as shown in instrument from Ada H. Cox to H. L. & P., dated March 2, 1961 and filed in Volume 347, Page 207, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- aa) Easement for electric transmission line as shown in instrument from T. Gordon, et al to Houston Lighting & Power Co., dated January 12, 1961 and filed in Volume 327, Page 556, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- bb) 22 ft. wide easement for road along Northwest line of subject property as shown by Plat of said Subdivision, filed in Volume 37, Page 640, Deed Records of Wharton County, Texas. (May affect subject tract, unable to plot, illegible plat)

HORIZONTAL DATUM: NAD83/NSRS2007  
VERTICAL DATUM: NAVD 88  
COMBINED SCALE FACTOR: 1.00037640  
BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
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DRAWN BY: R. Eckert

A 5.000 ACRE TRACT OUT OF  
D. DAVIS & D. BAKER SURVEY  
ABSTRACT No. 71  
AND  
A 5.000 ACRE TRACT OUT OF  
SYLVANUS CASTLEMAN SURVEY No. 4  
ABSTRACT No. 11  
WHARTON COUNTY, TEXAS

**LCRA**  
ENERGY • WATER • COMMUNITY SERVICES  
3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
(512)473-3200 www.lcra.org

EXHIBIT " E "

**BEING A 5.000 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11 IN WHARTON COUNTY, TEXAS, SAID 5.000 ACRE TRACT OF LAND BEING A PORTION OF BLOCK 70 AND LOT 1, BLOCK 101, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 5.000 ACRE TRACT OF LAND BEING A PORTION OF TRACT I, A 1059.68 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM HENDERSON FARMS, INC. TO CARAVELAS COMPANY, N.V., EXECUTED JANUARY 3, 1977, RECORDED IN VOLUME 491, PAGE 186, D.R.W.C.T., SAID 5.000 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:**

**BEGINNING** at a 5/8 inch iron rod with cap stamped "GORRONDONA" set (Grid Coordinates N=9,697,461.05 US Feet, E=3,658,965.28 US Feet) for corner in the northwest line of said Tract I and being in the southeast line of a 17.9 acre tract of land (by deed) currently known as County Road No. 120, described in deed from Gulf Coast Water Company to County of Wharton, Texas, executed June 28, 1939, recorded in Volume 139, Page 608, D.R.W.C.T., from which a 5/8 inch iron rod with cap stamped "GORRONDONA" found for an exterior ell corner of said Tract I and being the north corner of a 9.979 acre tract of land (by deed), described in a deed from Henderson Farms, Inc. to Lower Colorado River Authority, executed February 7, 1967, recorded in Volume 380, Page 680, D.R.W.C.T., bears, South 59 degrees 45 minutes 54 seconds West, a distance of 1757.99 feet;

**THENCE** North 59 degrees 45 minutes 54 seconds East, with the northwest line of said Tract I and with the southeast line of said 17.9 acre tract of land, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner, from which a 5/8 inch iron rod with cap stamped "GORRONDONA" found in the southeast line of said 17.9 acre tract of land for the northeast corner of said Tract I, bears, North 59 degrees 45 minutes 54 seconds East, a distance of 7189.56 feet, said 5/8 inch iron rod with cap stamped "GORRONDONA" being in the west line of Tract No. 2, a 129.3 acre tract of land (by deed), described in deed from Gulf Coast Rice Farms, Inc. to Gulf Coast Water Company, executed February 20, 1952, recorded in Volume 249, Page 109, D.R.W.C.T. and also being in the west line of "Lane City Section" (by deed), described in deed from Gulf Coast Water Company to Lower Colorado River Authority, executed December 31, 1959, recorded in Volume 318, Page 396, D.R.W.C.T.;

**THENCE** South 30 degrees 14 minutes 06 seconds East, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

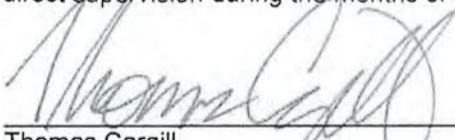
**THENCE** South 59 degrees 45 minutes 54 seconds West, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

**THENCE** North 30 degrees 14 minutes 06 seconds West, a distance of 466.69 feet to the **POINT OF BEGINNING**, and containing 5.000 acres of land, more or less.

Bearing Basis: Texas Lambert Grid, Central Zone, NAD83/NSRS2007.

All distances are surface values and in U. S. Survey Feet. To compute grid values multiply surface distances by a Combined Scale Factor of 1.00037640.

The field notes and the plat attached hereto represent an on-the-ground survey made under my direct supervision during the months of March 2013 to April 2013.

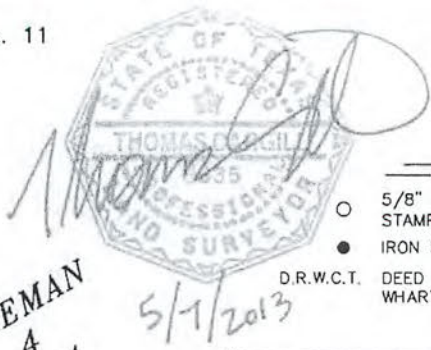
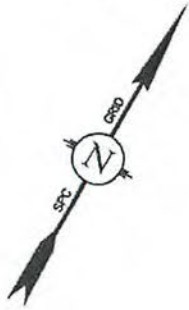
  
Thomas Cargill  
Registered Professional Land Surveyor No. 5835  
Gorrondona and Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933



Word File: LCRAW114A-0009A.DOC  
Drawing File: LCRAW114A-0009A.DWG



WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11

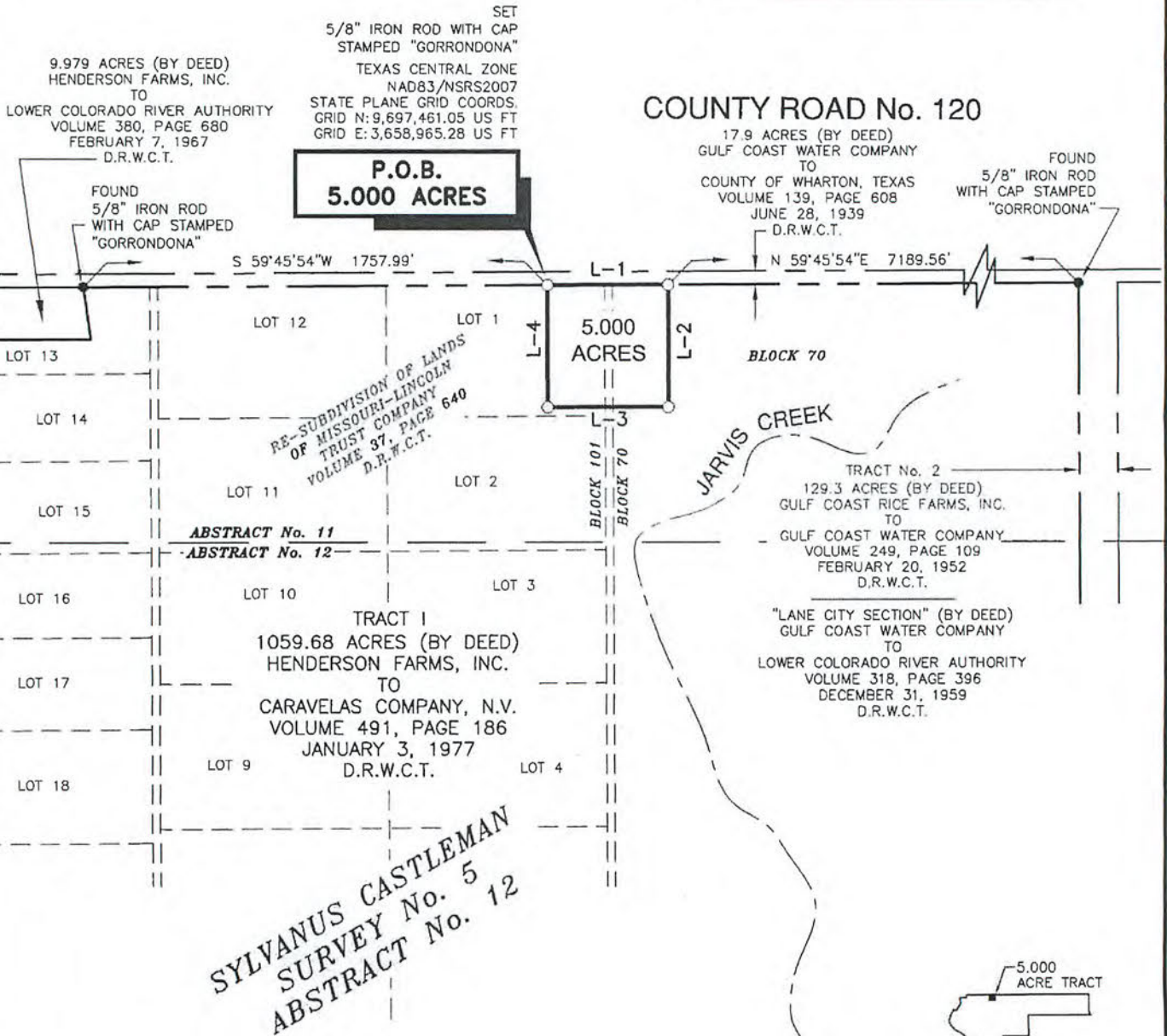


LEGEND

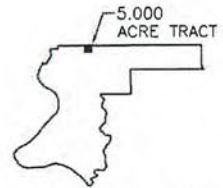
- 5/8" IRON ROD WITH CAP STAMPED "GORRONDONA" SET
  - IRON ROD FOUND (SIZE NOTED)
- D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS

**SYLVANUS CASTLEMAN SURVEY No. 4 ABSTRACT No. 11**

LINE TABLE		
LINE	BEARING	DISTANCE
L-1	N 59°45'54"E	466.69'
L-2	S 30°14'06"E	466.69'
L-3	S 59°45'54"W	466.69'
L-4	N 30°14'06"W	466.69'



**SYLVANUS CASTLEMAN SURVEY No. 5 ABSTRACT No. 12**



WHOLE PROPERTY MAP & LOCATION OF TRACT

NOTES:  
 1) SEE PAGE 3 FOR EASEMENT NOTES.

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
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 WORD FILE: LCRAW114A-0009A.doc  
 REVISION: 0  
 SCALE: 1"=600'  
 DATE: 5/7/2013  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

5.000 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 4  
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 WHARTON COUNTY, TEXAS





WHARTON COUNTY, TEXAS  
SYLVANUS CASTLEMAN SURVEY No. 4, ABSTRACT No. 11



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5.000 ACRE TRACT OUT OF  
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**LCRA**  
ENERGY • WATER • COMMUNITY SERVICES  
3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
(512)473-3200 www.lcra.org

SCANNED

MID-COAST TITLE CO., INC.  
111 N. Fulton  
Wharton, TX 77488

STATE OF TEXAS COUNTY OF WHARTON  
I, hereby certify that this document was filed on the date  
and time stamped and was recorded  
on 07/07/2013 2:41 PM

2013-0003742

*Andrea K. Sanders*



COUNTY CLERK, Wharton County, Texas  
By: *[Signature]* Deputy



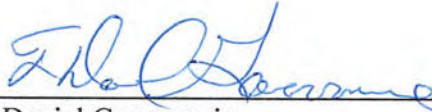


GRANTOR expressly reserves all oil, gas, and other minerals owned by GRANTOR, in, on, and under the PROPERTY, provided that GRANTOR shall not be permitted to drill or excavate for minerals on the surface of the PROPERTY, but GRANTOR may extract oil, gas, or other minerals from and under the PROPERTY by directional drilling or other means which do not interfere with or disturb GRANTEE'S use of the PROPERTY.

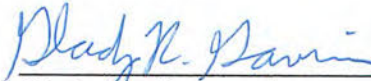
GRANTOR, for the CONSIDERATION and subject to the reservations from and exceptions to conveyance and warranty, grants, sells, and conveys to GRANTEE the PROPERTY, together with all and singular the rights and appurtenances thereto in any wise belonging, to have and hold it to GRANTEE, GRANTEE's heirs, executors, administrators, successors, or assigns forever. GRANTOR binds GRANTOR and GRANTOR's successors and assigns to warrant and forever defend all and singular the PROPERTY to GRANTEE and GRANTEE's heirs, executors, administrators, successors, and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof, except as to the reservations from and exceptions to conveyance and warranty, when the claim is by, through, or under GRANTOR, but not otherwise.

When the context requires, singular nouns and pronouns include the plural.

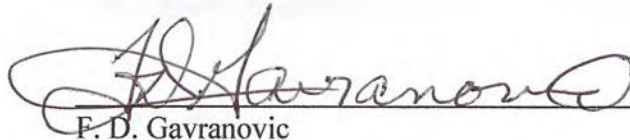
**GRANTOR**



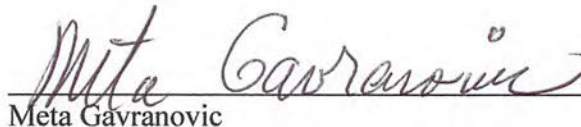
F. Daniel Gavranovic



Gladys R. Gavranovic



F. D. Gavranovic

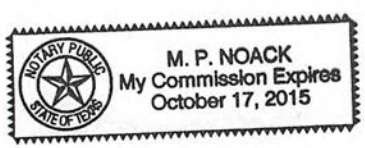


Meta Gavranovic

ACKNOWLEDGMENT

THE STATE OF TEXAS §  
  §  
COUNTY OF Wharton §

This instrument was acknowledged before me on this 6<sup>th</sup> day of April, 2015, by F. Daniel Gavranovic, Grantor.

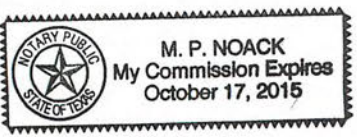


M P Noack  
Notary Public, State of Texas

ACKNOWLEDGMENT

THE STATE OF TEXAS §  
  §  
COUNTY OF Wharton §

This instrument was acknowledged before me on this 6<sup>th</sup> day of April, 2015, by Gladys R. Gavranovic, Grantor.

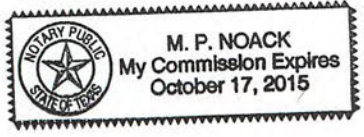


M P Noack  
Notary Public, State of Texas

ACKNOWLEDGMENT

THE STATE OF TEXAS §  
  §  
COUNTY OF Wharton §

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M P Noack  
Notary Public, State of Texas

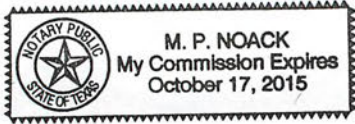
**ACKNOWLEDGMENT**

**THE STATE OF TEXAS**

§  
§  
§

**COUNTY OF** Wharton

This instrument was acknowledged before me on this 6<sup>th</sup> day of April, 2015, by Meta Gavranovic, Grantor.



M P Noack  
Notary Public, State of Texas

**After recording, return to:**  
Lower Colorado River Authority  
P. O. Box 220  
Austin, Texas 78767-0220  
Attn: Melvin Noack



EXHIBIT " A "

FIELD NOTE DESCRIPTION OF A 0.253 ACRE TRACT OF LAND IN THE JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630, OF WHARTON COUNTY, TEXAS; SAID 0.253 ACRE TRACT OF LAND BEING A PORTION OF BLOCK 38, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS, SAID 0.253 ACRE TRACT OF LAND ALSO BEING A PORTION OF A 75.42 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM DOROTHY MAE WISHERT ZIOBER, AS TO A LIFE ESTATE, PEGGY JO JONES, CAROL JEAN WOOTTON, GREGORY LYNN ZIOBER, KENNETH MAX ZIOBER, SUSAN KAY OLDAY, NANCY CAROL JOHNSON, DONALD MARK MEEK, DAVID R. MEEK, MARION ZIOBER, BEVERLY BACKSTROM, MARY CLARK, ALVIN FRANK ZIOBER, JOHN DAVID ZIOBER, JANE ANN ZIOBER SCHNIEDER, JOE D. KING, FRANK JOHN ZIOBER, LUCILLE HELEN ZIOBER JUREK, AND BETTY JEAN ZIOBER SHOPPA TO F. DANIEL GAVRANOVIC, AND SPOUSE, GLADYS R. GAVRANOVIC; F. D. GAVRANOVIC AND SPOUSE, META GAVRANOVIC, DATED APRIL 4, 2012, RECORDED IN BOOK 883, PAGE 850 OF THE OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS, THE PERIMETER OF SAID 0.253 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

**COMMENCING** at a 5/8 inch iron rod with cap stamped "GORRONDONA" found (Grid Coordinates= **Northing** 9,702,595.93 U.S. ft., **Easting** 3,671,082.83 U.S. ft.) for the north corner of said 75.42 acre tract, same being the east corner of a 189.492 acre tract (Tract Three) of land (by deed), described in deed from Caravelas Company to Lower Colorado River Authority, excuted June 26, 2013, recorded in Book 926, Page 233 of the Official Records of Wharton County, Texas, also being in the southwest right-of-way line of State Highway No. 60 (100 foot wide right-of-way);

**THENCE** leaving the southwest right-of-way line of said State Highway No. 60 with the common line of said 75.42 acre tract and said 189.492 acre tract the following three (3) courses and distances:

1. S 60°10'16" W, a distance of 572.73 feet to a 5/8 inch iron rod with cap stamped "RPLS #5319" found,
2. N 61°58'32" W, a distance of 74.44 feet to 1/2 inch iron rod found,
3. S 59°32'03" W, a distance of 1670.28 feet passing the south line of D. Davis & D. Baker Survey and the north line of said John McCrosky Survey No. 2 to a 5/8 inch iron rod with aluminum cap stamped "LCRA" set for the north corner of the this tract, in the northwest line of said 75.42 acre tract, same being the southeast line of said 189.492 acre tract, and the **POINT OF BEGINNING**(Grid Coordinates= **Northing** 9,701,498.75 U.S. ft., **Easting** 3,669,079.86 U.S. ft.);

**THENCE** S 42°16'16" E, a distance of 290.82 feet over and across said 75.42 acre tract to a 5/8 inch iron rod with aluminum cap stamped "LCRA" set for the east corner of this tract, in the southwest line of said 75.42 acre tract, same being the northeast line of a 129.3 acre tract(Tract No. 2) of land (by deed), described in deed from Gulf Coast Rice Farms, Inc. to Gulf Coast Water Company, executed February 20, 1952, recorded in Volume 249, Page 109, of the Deed Records of Wharton County, Texas, said 129.3 acre tract being conveyed in deed from Gulf Coast Water Company to Lower Colorado River Authority, executed December 31, 1959, recorded in Volume 318, Page 396, Deed Records of Wharton County, Texas, from which a 5/8 inch iron rod with cap stamped "RPLS #5319" found bears S 42°16'16" E, a distance of 1296.83 feet;

**THENCE**, with the common line of said 75.42 acre tract and said 129.3 acre tract, along a curve to the left, an arc length of 351.08 feet, having a radius of 458.00 feet, a central angle of 43°55'13", and whose chord bears, N 64°15'36" W, a distance of 342.55 feet, to a 5/8 inch iron rod with plastic cap stamped "RPLS #5319" found for the west corner of this tract, same being the west corner of said 75.42 acre tract, also being in the southeast line of said 189.492 acre tract, same being in the northeast line of said 129.3 acre tract;

Wharton County, Texas  
John McCrosky Survey No. 2, Abstract No. 630  
Lower Colorado River Authority

0.253 Acres  
Page 2 of 4

**THENCE** N 59°32'03" E, a distance of 131.03 feet with the common line of said 75.42 acre tract and said 189.492 acre tract to the **POINT OF BEGINNING**, and containing 0.253 acres of land, more or less.

Bearing Basis: Texas Lambert Grid, Central Zone, NAD 83/NSRS 2007.  
All distances are surface values; to obtain grid values multiply surface distances by a Combined Scale Factor of 1.00036778. All distance units are U.S. Survey Feet.

This description and plat attached hereto represent an on-the-ground survey made under my direct supervision during the months of October and November 2013.

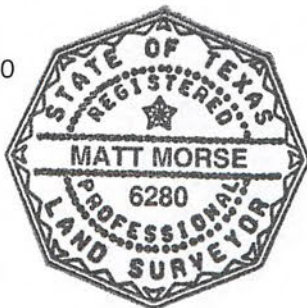
*Matt Morse*      *11-7-2013*

Matt Morse

Date

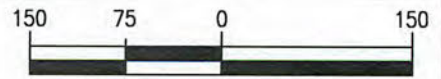
Registered Professional Land Surveyor No. 6280  
Lower Colorado River Authority  
3700 Lake Austin Boulevard  
Austin, Texas 78703  
(512) 473-3200  
TBPLS FIRM# 10152700

WORD FILE: LCRAW123A-0001A.doc  
ACAD FILE: LCRAW123A-0001A.dwg





JOHN McCROSKY SURVEY No. 2  
 ABSTRACT No. 630  
 WHARTON COUNTY, TEXAS



GRAPHIC SCALE

**SYMBOL TABLE**

- IRON ROD FOUND (SIZE & TYPE NOTED)
- ⊙ 5/8" IRON ROD WITH ALUMINUM CAP STAMPED "LCRA" SET
- ( ) RECORD INFORMATION VOL. 883, PG. 850
- [ ] RECORD INFORMATION VOL. 926, PG. 233
- ⚡ BREAK IN SCALE

CARAVELAS COMPANY  
 TO  
 LOWER COLORADO RIVER AUTHORITY  
 189.492 ACRES (TRACT THREE)  
 BOOK 926, PAGE 233  
 JUNE 26, 2013  
 OFFICIAL RECORDS OF  
 WHARTON COUNTY, TEXAS



APPROXIMATE SURVEY LINE  
 JOHN McCROSKY SURVEY No. 2  
 ABSTRACT No. 630

Texas Central Zone  
 NAD 83/NSRS 2007  
 Lat.: 29°12'21.87195"  
 Lon.: 96°01'55.00780"  
 State Plane Grid Coords  
 N(Y): 9701498.75 USft  
 E(X): 3669079.86 USft

D. DAVIS & SONS SURVEY  
 ABSTRACT No. 77

**P.O.B.**  
 0.253 ACRE

BLOCK 39  
 BLOCK 38

(S 60°17'33" W 1801.20')  
 [S 59°32'08" W 1801.22']  
 S 59°32'03" W 1801.31'

0.253 ACRE

**P.O.C.**  
 0.253 ACRE

Texas Central Zone  
 NAD 83/NSRS 2007  
 Lat.: 29°12'31.95482"  
 Lon.: 96°01'31.95300"  
 State Plane Grid Coords  
 N(Y): 9702595.93 USft  
 E(X): 3671082.83 USft

C1  
 Δ= 43°55'13"  
 R= 458.00  
 Arc= 351.08  
 CB= N 64°15'36" W  
 CL= 342.55

GULF COAST RICE FARMS, INC.  
 TO  
 GULF COAST WATER COMPANY  
 129.3 ACRES (TRACT No. 2)  
 VOLUME 249, PAGE 109  
 FEBRUARY 20, 1952  
 DEED RECORDS OF  
 WHARTON COUNTY, TEXAS

GULF COAST WATER COMPANY  
 TO  
 LOWER COLORADO RIVER  
 AUTHORITY  
 "LANE CITY SECTION"  
 VOLUME 318, PAGE 396  
 DECEMBER 31, 1959  
 DEED RECORDS OF  
 WHARTON COUNTY, TEXAS

DOROTHY MAE WISHERT ZIOBER, AS TO A LIFE ESTATE,  
 PEGGY JO JONES, CAROL JEAN WOOTTON, GREGORY LYNN  
 ZIOBER, KENNETH MAX ZIOBER, SUSAN KAY OLDA, NANCY  
 CAROL JOHNSON, DONALD MARK MEEK, DAVID R. MEEK,  
 MARION ZIOBER, BEVERLY BACKSTROM, MARY CLARK, ALVIN  
 FRANK ZIOBER, JOHN DAVID ZIOBER, JANE ANN ZIOBER  
 SCHNIEDER, JOE D. KING, FRANK JOHN ZIOBER, LUCILLE  
 HELEN ZIOBER JUREK, AND BETTY JEAN ZIOBER SHOPPA  
 TO

F. DANIEL GAVRANOVIC, AND SPOUSE, GLADYS R.  
 GAVRANOVIC;  
 F. D. GAVRANOVIC, AND SPOUSE META GAVRANOVIC  
 75.42 ACRES  
 BOOK 883, PAGE 850  
 APRIL 4, 2012  
 OFFICIAL RECORDS OF  
 WHARTON COUNTY, TEXAS

**LINE TABLE**

L1	S 42°16'16"	E - 290.82'
L2	N 59°32'03"	E - 131.03'
L3	S 60°10'16"	W - 572.73'
	(N 60°55'03"	E - 572.77')
	[S 60°09'38"	W - 573.01']
L4	N 61°58'32"	W - 74.44'
	(S 61°12'27"	E - 74.50')
	[N 61°57'52"	W - 74.50']
L5	S 59°32'03"	W - 1670.28'

HORIZONTAL DATUM: NAD83/NSRS 2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00036778  
 BEARING BASIS: TX. LAMBERT GRID CENTRAL ZONE  
 DISTANCES SHOWN ARE SURFACE VALUES

CANAL

S 42°16'16" E - 290.82'  
 (N 41°30'57" W)  
 E - 1299.83'  
 (N)

5/8" IRON ROD  
 W/PLASTIC CAP  
 "RPLS #5319"



\*NOTE: SEE PAGE 3 FOR EASEMENT NOTES.

ACAD FILE: LCRAW123A-0001A.dwg  
 WORD FILE: LCRAW123A-0001A.doc  
 REVISION: --  
 SCALE: 1"=150'  
 DATE: 11/07/2013  
 WO NO.: 2716575  
 FIELD BOOK: 2013-05 PG. 52  
 DRAWN BY: DRM DUO

PLAT SHOWING A 0.253 ACRE  
 TRACT OF LAND  
 LOCATED IN THE  
 JOHN McCROSKY SURVEY No. 2  
 ABSTRACT No. 630  
 WHARTON COUNTY, TEXAS

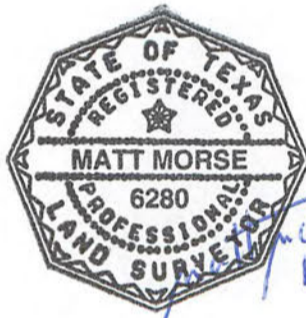
**LCRA**  
 ENERGY • WATER • COMMUNITY SERVICES  
 3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
 (512)473-3200 www.lcra.org  
 TBPLS FIRM# 10152700



JOHN McCROSKY SURVEY No. 2  
ABSTRACT No. 630  
WHARTON COUNTY, TEXAS

ONLY THESE EASEMENTS LISTED IN LIMITED TITLE CERTIFICATE PROVIDED BY LCRA REAL ESTATE SERVICES, AND DATED 10-09-2013 WERE EVALUATED FOR THIS SURVEY. NO OTHER EASEMENT RECORD RESEARCH WAS PERFORMED.

PIPELINE RIGHT-OF-WAY AND EASEMENT TO JOHNSON & APPLING, A PARTNERSHIP COMPOSED OF R.M. JOHNSON AND W.D. APPLING OF EL CAMPO, TEXAS, DATED AUGUST 3, 1953, RECORDED IN VOLUME 262, PAGE 83, DEED RECORDS OF WHARTON COUNTY, TEXAS  
(MAY AFFECT SUBJECT TRACT, UNABLE TO PLOT EXACT LOCATION)



HORIZONTAL DATUM: NAD83/NSRS 2007  
VERTICAL DATUM: NAVD 88  
COMBINED SCALE FACTOR: 1.00036778  
BEARING BASIS: TX. LAMBERT GRID CENTRAL ZONE  
DISTANCES SHOWN ARE SURFACE VALUES

ACAD FILE: LCRAW123A-0001A.dwg  
WORD FILE: LCRAW123A-0001A.doc  
REVISION: --  
SCALE: 1"=150'  
DATE: 11/07/2013  
WO NO.: 2716575  
FIELD BOOK: 2013-05 PG. 52  
DRAWN BY: DRM DUO

PLAT SHOWING A 0.253 ACRE  
TRACT OF LAND  
LOCATED IN THE  
JOHN McCROSKY SURVEY No. 2  
ABSTRACT No. 630  
WHARTON COUNTY, TEXAS

**LCRA**  
ENERGY • WATER • COMMUNITY SERVICES  
3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
(512)473-3200 www.lcra.org  
TBPLS FIRM# 10152700



Pd. \$54.00  
LCRA

SCANNED

STATE OF TEXAS COUNTY OF WHARTON  
I, hereby certify that this document was filed on the date  
and time stamped and was recorded  
on 04/07/2015 2:41 PM

2015-000001688

*Andrea K. Sanders*



COUNTY CLERK, Wharton County, Texas  
By: *gm* Deputy

## **Worksheet 2**

### **Attachment 1:**

#### **Inundated Area Deeds**

**OCL-03**

Dec ID: 003114880007 Type: OFF  
Kind: DEED  
Recorded: 07/01/2013 at 02:43:11 PM  
Fee Amt: \$40.00 Page 1 of 7  
Wharton, TX -  
Sandra K. Sanders County Clerk  
File# 2013-00003744  
BK **926** PG **305-311**

Space Above This Line Reserved For Recording Data

**NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.**

GF#2012-0906

### **Exchange Special Warranty Deed**

**Date:** June 26, 2013

**Grantor:** **F & D GAVRANOVIC FARMS FAMILY LIMITED PARTNERSHIP**, a Texas Limited Partnership

**Grantor's Mailing Address:**

415 FM 2817 Road  
Wharton, Texas 774886  
Wharton County

**Grantee:** **LOWER COLORADO RIVER AUTHORITY**, a political subdivision of the State of Texas

**Grantee's Mailing Address:**

P.O. Box 220  
Austin, Texas 78767  
Travis County

**Consideration:**

Ten dollars (\$10.00) and other consideration paid pursuant to an agreement with Grantee, a political subdivision of the State of Texas, with power of Eminent Domain, as defined in §1033 of the Internal Revenue Code.

**Property (including any improvements):**

Being a 281.346 Acre Tract of Land Situated in Sylvanus Castleman Survey No. 5, Abstract No. 12 and John McCrosky Survey No 2, Abstract No. 630, both in Wharton County, Texas, said 281.346 Acre Tract of Land Being a portion of Block 38, Block 47, And Block 70, Re-subdivision of Lands of Missouri-Lincoln Trust Company, as Recorded in Volume 37, Page 640 of the Deed Records of Wharton County, Texas (D.R.W.C.T.), Said 281.346 Acre Tract of Land being all of a 277.33 Acre Tract of Land (By Deed), Described in Deed From F. D. Gavranovic to F. D. Gavranovic, Jr., executed October 29, 1997, Recorded in Volume 255, Page 813 of The Official Records of Wharton County, Texas, (O.R.W.C.T.), Said 281.346 acre tract of land being more particularly described by metes and bounds on **EXHIBIT "A"** pages 1-2 and depicted on the plat shown in **EXHIBIT "A"** pages 3-4, attached hereto and made a part hereof for all purposes.

**Reservations from Conveyance:** SAVE AND EXCEPT, that out of the grant hereby made, there is excepted and reserved unto the Grantor herein, Grantor's heirs and assigns, all of the oil, gas and other minerals of every kind and character, in, on and under and that may be produced from the lands and premises hereinabove described.

**Exceptions to Conveyance and Warranty:**

1. Standby fees, taxes and assessments by any taxing authority for the current year, and subsequent years; and subsequent taxes and assessments by any taxing authority for prior years due to change in land usage or ownership, but not those taxes or assessments for prior years because of an exemption granted to a previous owner of the property under Section 11.13, Texas Tax Code, or because of improvements not assessed for a previous tax year.
2. Any visible or apparent roadway depicted on Exhibit A, if any, or easement over or across the subject property, the existence of which does not appear of record.
3. That certain mineral interest, the royalties, bonuses, rentals and all other rights in connection with said mineral rights, as reserved in perpetuity in instrument dated May 20, 1937, executed by Susan L. Houston in favor of Ada Houston Cox, recorded in Volume 130, Page 384 of the Deed Records of Wharton County, Texas.
4. Easement for electrical transmission line as shown in instrument from Ada Houston Cox to Houston Lighting & Power, dated March 2, 1961 and filed in Volume 347, Page 207 of the Deed Records of Wharton County, Texas.

This conveyance includes all interest of Grantor, if any, in (a) strips and gores, if any, between the above described property and any abutting properties, whether owned or claimed by deed, limitations, or otherwise, and whether located inside or outside the above described property; and (b) any land lying in or under the bed of any creek, stream, or waterway or any highway, avenue, street, road, alley, easement or right-of-way, open or proposed, in, on, across, abutting, or adjacent to the above described property; and (c) all other interest of every kind and character which Grantor now has or at any time hereafter acquires in and to the above described property and all property which is used or useful in connection with the above described property, including all rights, privileges and appurtenances pertaining thereto; including but not limited to, easements, rights-of-way, water rights, claims and permits, and all rights, and obligations of applicable government programs and cooperative or association memberships applicable to the above described property.

Grantor conveys to Grantee the right to pursue any claims for damages against any third party who may have damaged the Property during the Grantor's ownership thereof.

Grantor, for the Consideration and subject to the Reservations from Conveyance and the Exceptions to Conveyance and Warranty, grants, sells, and conveys to Grantee the Property, together with all and singular the rights and appurtenances thereto in any way belonging, to have and to hold it to Grantee and Grantee's heirs, successors, and assigns forever. Grantor binds Grantor and Grantor's heirs and successors to warrant and forever defend all and singular the Property to Grantee and Grantee's heirs, successors, and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof when the claim is by, through, or under Grantor but not otherwise, except as to the Reservations from Conveyance and the Exceptions to Conveyance and Warranty.

When the context requires, singular nouns and pronouns include the plural.

F & D GAVRANOVIC FARMS FAMILY LIMITED PARTNERSHIP, a Texas Limited Partnership

By: F & D GAVRANOVIC FARMS GP, LLC

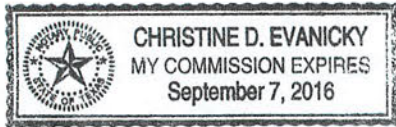
By: [Signature]  
F. DANIEL GAVRANOVIC, JR., President

By: [Signature]  
F. D. GAVRANOVIC, Vice President

STATE OF TEXAS )

COUNTY OF WHARTON )

This instrument was acknowledged before me on 27 day of June, 2013, by F. DANIEL GAVRANOVIC, JR., President of F & D GAVRANOVIC FARMS GP, LLC.

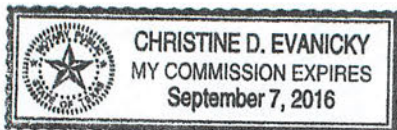


[Signature]  
Notary Public, State of Texas

STATE OF TEXAS )

COUNTY OF WHARTON )

This instrument was acknowledged before me on 27 day of June, 2013, by F. D. GAVRANOVIC, Vice President of F & D GAVRANOVIC FARMS GP, LLC.



[Signature]  
Notary Public, State of Texas

PREPARED IN THE OFFICE OF AND  
AFTER RECORDING RETURN TO:

Duckett, Boulogny & Collins, LLP  
207 W. Jackson  
P.O. Box 1567  
El Campo, TX 77437  
Tel: (979) 543-6845  
Fax: (979) 543-9516

Y:\GHI Clients\Gavranovic, Frank & Daniel\2012.08.RE.LCRA.JAB\Special Warranty Deed.WPD



EXHIBIT " **A** "

**BEING A 281.346 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12 AND JOHN McCROSKY SURVEY No 2, ABSTRACT No. 630, BOTH IN WHARTON COUNTY, TEXAS, SAID 281.346 ACRE TRACT OF LAND BEING A PORTION OF BLOCK 38, BLOCK 47, AND BLOCK 70, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 281.346 ACRE TRACT OF LAND BEING ALL OF A 277.33 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM F. D. GAVRANOVIC TO F. D. GAVRANOVIC, JR., EXECUTED OCTOBER 29, 1997, RECORDED IN VOLUME 255, PAGE 813 OF THE OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS, (O.R.W.C.T.), SAID 281.346 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:**

**BEGINNING** at an axle found (Grid Coordinates N=9,697,617.94 US Feet, E=3,662,320.72 US Feet) for the northwest corner of said 277.33 acre tract of land and being an interior ell corner of Tract I, a 1059.68 acre tract of land (by deed), described in deed from Henderson Farms, Inc. to Caravelas Company N.V., executed January 3, 1977, recorded in Volume 491, Page 186, D.R.W.C.T.;

**THENCE** North 60 degrees 08 minutes 23 seconds East, with a north line of said 277.33 acre tract of land and with an interior line of said Tract I, passing the northeast line of said Block 70, the southwest line of said Block 47, the northeast line of said Block 47, a 30 foot wide unnamed road as shown on said Re-Subdivision of lands of Missouri-Lincoln Trust Company plat, the southwest line of said Block 38, the east line of said Sylvanus Castleman Survey No. 5, and the west line of said John McCrosky Survey No. 2, in all, a distance of 4859.52 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for an exterior ell corner of said 277.33 acre tract of land and for the easterly northeast corner of said Tract I, said 5/8 inch iron rod with cap stamped "GORRONDONA" also being in a curving south line of Tract No. 2, a 129.3 acre tract of land (by deed), described in deed from Gulf Coast Water Company to Lower Colorado River Authority, executed December 31, 1959, recorded in Volume 318, Page 396, D.R.W.C.T.;

**THENCE**, with a curving north line of said 277.33 acre tract of land and with a curving south line of said 129.3 acre tract of land, along a curve to the left, an arc length of 301.58 feet, having a radius of 458.00 feet, a central angle of 37 degrees 43 minutes 41 seconds, and whose chord bears, North 78 degrees 31 minutes 15 seconds East, a distance of 296.16 feet to a calculated point in water for a point of tangency in a north line of said 277.33 acre tract of land and in the south line of said 129.3 acre tract of land;

**THENCE** North 59 degrees 39 minutes 24 seconds East, with a north line of said 277.33 acre tract of land and with a south line of said 129.3 acre tract of land, a distance of 2263.17 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the westerly northeast corner of said 277.33 acre tract of land and an interior corner of said 129.3 acre tract of land;

**THENCE** with a curving north line of said 277.33 acre tract of land and with a curving south line of said 129.3 acre tract of land, along a curve to the right, an arc length of 426.78 feet, having a radius of 308.00 feet, a central angle of 79 degrees 23 minutes 28 seconds, and whose chord bears South 80 degrees 38 minutes 52 seconds East, a distance of 393.44 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the easterly northeast corner of said 277.33 acre tract of land and an interior corner of said 129.3 acre tract of land;

**THENCE** South 40 degrees 57 minutes 08 seconds East, with the northeast line of said 277.33 acre tract of land and with a south line of said 129.3 acre tract of land, passing at a distance of 1257.06 feet a concrete monument with disc stamped "LCRA SURVEY MARK" (disturbed) found for reference, continuing with the northeast line of said 277.33 acre tract of land, and a south line of said 129.3 acre tract of land, in all, a distance of 1287.76 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the southeast corner of said 277.33 acre tract of land, and for the northeast corner of Tract III, a 379.68 acre tract of land (by deed), described in deed from Henderson Farms, Inc. to Caravelas Company N.V., executed January 3, 1977, recorded in Volume 491, Page 186, D.R.W.C.T., said 5/8 inch iron rod with cap stamped "GORRONDONA" being in the approximate centerline of a 44 foot wide road dedication as shown on said Re-Subdivision of lands of Missouri-Lincoln Trust Company plat, currently known as County Road No. 116 (a/k/a Henry Road) and being in the common block line of said Block 38 and Block 48 of said Re-Subdivision of lands of Missouri-Lincoln Trust Company;

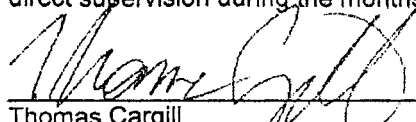
**THENCE** South 59 degrees 50 minutes 29 seconds West, with the south line of said 277.33 acre tract of land, with the north line of said Tract III, with the approximate centerline of said 44 foot wide road currently known as County Road No. 116, with the south line of said Block 38, with the north line of said Block 48, and with the north line of Block 69, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, passing at a distance of 5667.22 feet, a calculated point for the northwest corner of said Tract III and the northeast corner of a 188.90 acre tract of land (by deed), described in deed from John W. Williams and Kimberly J. Williams to Greg A. Koenig and Ronald C. Koenig, executed February 19, 2008, recorded in Volume 733, Page 743, O.R.W.C.T., said calculated point also being the common corner of said Block 47, said Block 70, said Block 69, and Block 71 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, from which a 3/4 inch iron pipe found, bears, North 30 degrees 16 minutes 31 seconds West, a distance of 0.75 feet and from said calculated point, a 5/8 inch iron rod with cap stamped "5319" found in the west line of said Tract III, in the east line of said 188.90 acre tract of land in the west line of said Block 69, and in the east line of said Block 71 bears, South 30 degrees 16 minutes 31 seconds East, a distance of 29.22 feet, continuing with the south line of said 277.33 acre tract of land, with the north line of said 188.90 acre tract of land, with the south line of said Block 70, and with the north line of said Block 71, passing at a distance of 7651.59 feet, a calculated point for the northwest corner of said 188.90 acre tract of land and for the northeast corner of Tract Three, a 188.69 acre tract of land (by deed), described in deed from Joan Reid Anderson and husband, Keith Anderson to Jean Reid Severn, executed November 1, 1979, recorded in Volume 525, Page 612, D.R.W.C.T., from which a 5/8 inch iron rod found (disturbed) in the west line of said 188.90 acre tract of land and in the east line of said 188.69 acre tract of land, bears, South 30 degrees 16 minutes 31 seconds East, a distance of 0.59 feet, and from said calculated point a 5/8 inch iron rod with cap stamped "5319" found in the west line of said 188.90 acre tract of land and in the east line of said 188.69 acre tract of land bears, South 30 degrees 16 minutes 31 seconds East, a distance of 30.57 feet, continuing with the south line of said 277.33 acre tract of land, with the north line of said 188.69 acre tract of land, with the south line of said Block 70, and with the north line of said Block 71, in all, a distance of 7897.26 feet to a 5/8 inch iron rod found for the southwest corner of said 277.33 acre tract of land and for an exterior ell corner of said Tract I;

**THENCE** North 31 degrees 56 minutes 22 seconds West, with the west line of said 277.33 acre tract of land and with an interior line of said Tract I, a distance of 1628.93 feet to the **POINT OF BEGINNING**, and containing 281.346 acres of land, more or less.

Bearing Basis: Texas Lambert Grid, Central Zone, NAD83/NSRS2007.

All distances are surface values and in U. S. Survey Feet. To compute grid values multiply surface distances by a Combined Scale Factor of 1.00037640.

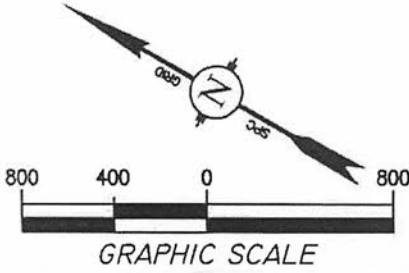
The field notes and the plat attached hereto represent an on-the-ground survey made under my direct supervision during the months of September 2012 to November 2012.

  
Thomas Cargill  
Registered Professional Land Surveyor No. 5835  
Gorrondona and Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933



Word File: LCRAW114A-0002B.DOC  
Drawing File: LCRAW114A-0002B.DWG

WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12  
 JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630

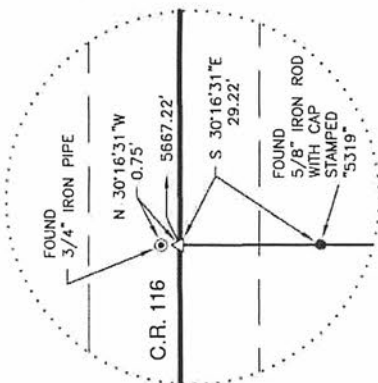


CURVE TABLE			
C-1	RADIUS	DELTA ANGLE	ARC LENGTH
	458.00'	37°43'41"	301.58'
C-2	RADIUS	DELTA ANGLE	ARC LENGTH
	308.00'	79°23'28"	426.78'
C-1	CHORD BEARING	CHORD LENGTH	
	N 78°31'15"E	296.16'	
C-2	CHORD BEARING	CHORD LENGTH	
	S 80°38'52"E	393.44'	

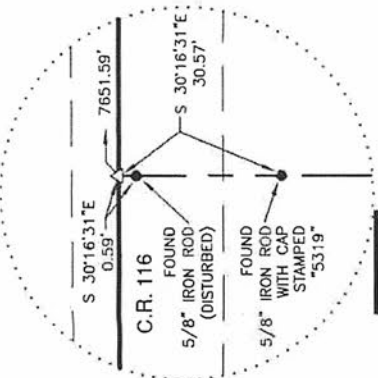
LEGEND

- △ CALCULATED POINT
- ⊙ IRON PIPE FOUND (SIZE NOTED)
- IRON ROD FOUND (SIZE NOTED)
- ⊠ "LCRA" CONCRETE MONUMENT FOUND

D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS  
 O.R.W.C.T. OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS



DETAIL "A"  
(NOT TO SCALE)



DETAIL "B"  
(NOT TO SCALE)

NOTE:  
 SEE PAGE 4 FOR EASEMENT NOTES.

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.

**P.O.B.**  
**281.346 ACRES**



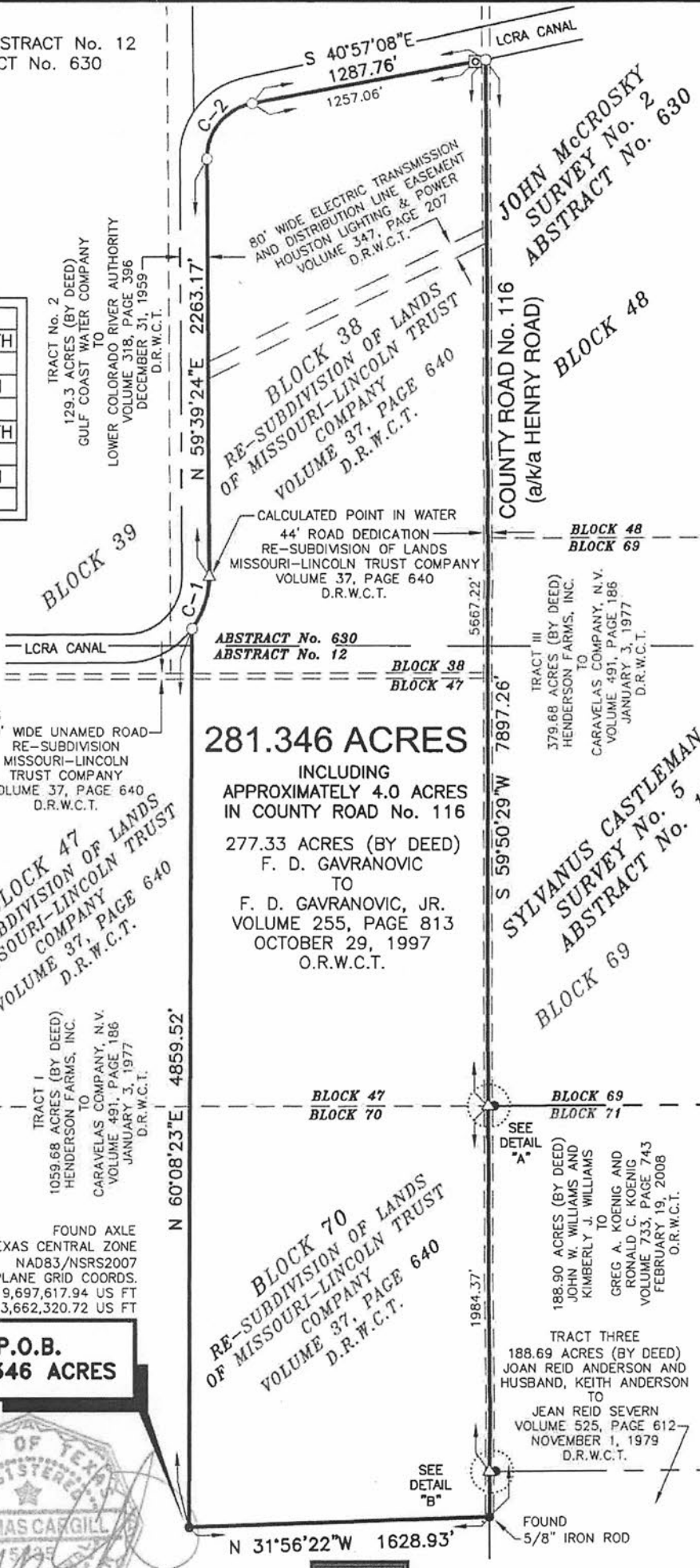
12/17/2012



Gorrondona & Associates, Inc.  
 4201 W. Parmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 719-9933

ACAD FILE: LCRAW114A-0002B.dwg  
 WORD FILE: LCRAW114A-0002B.doc  
 REVISION: 1  
 SCALE: 1"=800'  
 DATE: 12/17/2012  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

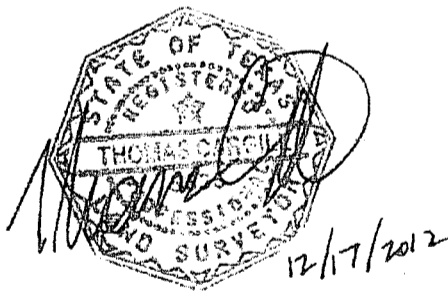
281.346 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 5  
 ABSTRACT No. 12  
 JOHN McCROSKY SURVEY No. 2  
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 WHARTON COUNTY, TEXAS



WHARTON COUNTY, TEXAS  
SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12  
JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630

ONLY THESE EASEMENTS LISTED IN LIMITED TITLE CERTIFICATE GF No. 2012-0906  
DATED AUGUST 31, 2012, BY FIRST AMERICAN TITLE INSURANCE COMPANY WERE EVALUATED FOR  
THIS SURVEY EXCEPT AS SHOWN.  
NO OTHER EASEMENT RECORD RESEARCH WAS PERFORMED BY GORRONDONA & ASSOCIATES INC.

Easement Note:  
An 80 foot wide electric transmission and distribution line easement to Houston Power & Light  
recorded in Volume 347, Page 207 of the Deed Records of Wharton County, Texas was provided  
and is shown hereon, however it was not listed in Title Commitment provided.



HORIZONTAL DATUM: NAD83/NSRS2007  
VERTICAL DATUM: NAVD 88  
COMBINED SCALE FACTOR: 1.00037640  
BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
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281.346 ACRE TRACT OUT OF  
SYLVANUS CASTLEMAN SURVEY No. 5  
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JOHN McCROSKY SURVEY No. 2  
ABSTRACT No. 630  
WHARTON COUNTY, TEXAS

**LCRA**  
ENERGY-WATER-COMMUNITY SERVICES  
3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
(512)473-3200 www.lcra.org

MID-COAST TITLE CO., INC.  
111 N. Fulton  
Wharton, TX 77488

STATE OF TEXAS COUNTY OF WHARTON  
I, hereby certify that this document was filed on the date  
and time stamped and was recorded  
on 07/09/2013 2:43 PM  
2013-00003744  
*Andrea K. Anderson*



COUNTY CLERK, Wharton County, Texas  
By: *[Signature]* Deputy

SCANNED

Dec ID: 003114880007 Type: OFF  
Kind: DEED  
Recorded: 07/01/2013 at 02:43:11 PM  
Fee Amt: \$40.00 Page 1 of 7  
Wharton, TX -  
Sandra K. Sanders County Clerk  
File# 2013-00003744  
BK **926** PG **305-311**

Space Above This Line Reserved For Recording Data

**NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.**

GF#2012-0906

### **Exchange Special Warranty Deed**

**Date:** June 26, 2013

**Grantor:** **F & D GAVRANOVIC FARMS FAMILY LIMITED PARTNERSHIP**, a Texas Limited Partnership

**Grantor's Mailing Address:**

415 FM 2817 Road  
Wharton, Texas 774886  
Wharton County

**Grantee:** **LOWER COLORADO RIVER AUTHORITY**, a political subdivision of the State of Texas

**Grantee's Mailing Address:**

P.O. Box 220  
Austin, Texas 78767  
Travis County

**Consideration:**

Ten dollars (\$10.00) and other consideration paid pursuant to an agreement with Grantee, a political subdivision of the State of Texas, with power of Eminent Domain, as defined in §1033 of the Internal Revenue Code.

**Property (including any improvements):**

Being a 281.346 Acre Tract of Land Situated in Sylvanus Castleman Survey No. 5, Abstract No. 12 and John McCrosky Survey No 2, Abstract No. 630, both in Wharton County, Texas, said 281.346 Acre Tract of Land Being a portion of Block 38, Block 47, And Block 70, Re-subdivision of Lands of Missouri-Lincoln Trust Company, as Recorded in Volume 37, Page 640 of the Deed Records of Wharton County, Texas (D.R.W.C.T.), Said 281.346 Acre Tract of Land being all of a 277.33 Acre Tract of Land (By Deed), Described in Deed From F. D. Gavranovic to F. D. Gavranovic, Jr., executed October 29, 1997, Recorded in Volume 255, Page 813 of The Official Records of Wharton County, Texas, (O.R.W.C.T.), Said 281.346 acre tract of land being more particularly described by metes and bounds on **EXHIBIT "A"** pages 1-2 and depicted on the plat shown in **EXHIBIT "A"** pages 3-4, attached hereto and made a part hereof for all purposes.

**Reservations from Conveyance:** SAVE AND EXCEPT, that out of the grant hereby made, there is excepted and reserved unto the Grantor herein, Grantor's heirs and assigns, all of the oil, gas and other minerals of every kind and character, in, on and under and that may be produced from the lands and premises hereinabove described.

**Exceptions to Conveyance and Warranty:**

1. Standby fees, taxes and assessments by any taxing authority for the current year, and subsequent years; and subsequent taxes and assessments by any taxing authority for prior years due to change in land usage or ownership, but not those taxes or assessments for prior years because of an exemption granted to a previous owner of the property under Section 11.13, Texas Tax Code, or because of improvements not assessed for a previous tax year.
2. Any visible or apparent roadway depicted on Exhibit A, if any, or easement over or across the subject property, the existence of which does not appear of record.
3. That certain mineral interest, the royalties, bonuses, rentals and all other rights in connection with said mineral rights, as reserved in perpetuity in instrument dated May 20, 1937, executed by Susan L. Houston in favor of Ada Houston Cox, recorded in Volume 130, Page 384 of the Deed Records of Wharton County, Texas.
4. Easement for electrical transmission line as shown in instrument from Ada Houston Cox to Houston Lighting & Power, dated March 2, 1961 and filed in Volume 347, Page 207 of the Deed Records of Wharton County, Texas.

This conveyance includes all interest of Grantor, if any, in (a) strips and gores, if any, between the above described property and any abutting properties, whether owned or claimed by deed, limitations, or otherwise, and whether located inside or outside the above described property; and (b) any land lying in or under the bed of any creek, stream, or waterway or any highway, avenue, street, road, alley, easement or right-of-way, open or proposed, in, on, across, abutting, or adjacent to the above described property; and (c) all other interest of every kind and character which Grantor now has or at any time hereafter acquires in and to the above described property and all property which is used or useful in connection with the above described property, including all rights, privileges and appurtenances pertaining thereto; including but not limited to, easements, rights-of-way, water rights, claims and permits, and all rights, and obligations of applicable government programs and cooperative or association memberships applicable to the above described property.

Grantor conveys to Grantee the right to pursue any claims for damages against any third party who may have damaged the Property during the Grantor's ownership thereof.

Grantor, for the Consideration and subject to the Reservations from Conveyance and the Exceptions to Conveyance and Warranty, grants, sells, and conveys to Grantee the Property, together with all and singular the rights and appurtenances thereto in any way belonging, to have and to hold it to Grantee and Grantee's heirs, successors, and assigns forever. Grantor binds Grantor and Grantor's heirs and successors to warrant and forever defend all and singular the Property to Grantee and Grantee's heirs, successors, and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof when the claim is by, through, or under Grantor but not otherwise, except as to the Reservations from Conveyance and the Exceptions to Conveyance and Warranty.



When the context requires, singular nouns and pronouns include the plural.

F & D GAVRANOVIC FARMS FAMILY LIMITED PARTNERSHIP, a Texas Limited Partnership

By: F & D GAVRANOVIC FARMS GP, LLC

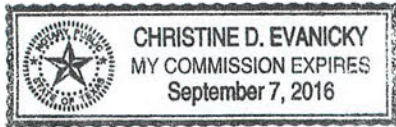
By: [Signature]  
F. DANIEL GAVRANOVIC, JR., President

By: [Signature]  
F. D. GAVRANOVIC, Vice President

STATE OF TEXAS )

COUNTY OF WHARTON )

This instrument was acknowledged before me on 27 day of June, 2013, by F. DANIEL GAVRANOVIC, JR., President of F & D GAVRANOVIC FARMS GP, LLC.

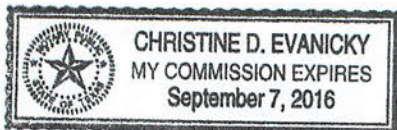


[Signature]  
Notary Public, State of Texas

STATE OF TEXAS )

COUNTY OF WHARTON )

This instrument was acknowledged before me on 27 day of June, 2013, by F. D. GAVRANOVIC, Vice President of F & D GAVRANOVIC FARMS GP, LLC.



[Signature]  
Notary Public, State of Texas

PREPARED IN THE OFFICE OF AND  
AFTER RECORDING RETURN TO:

Duckett, Boulogny & Collins, LLP  
207 W. Jackson  
P.O. Box 1567  
El Campo, TX 77437  
Tel: (979) 543-6845  
Fax: (979) 543-9516

Y:\GHI Clients\Gavranovic, Frank & Daniel\2012.08.RE.LCRA.JAB\Special Warranty Deed.WPD



EXHIBIT " **A** "

**BEING A 281.346 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12 AND JOHN McCROSKY SURVEY No 2, ABSTRACT No. 630, BOTH IN WHARTON COUNTY, TEXAS, SAID 281.346 ACRE TRACT OF LAND BEING A PORTION OF BLOCK 38, BLOCK 47, AND BLOCK 70, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 281.346 ACRE TRACT OF LAND BEING ALL OF A 277.33 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM F. D. GAVRANOVIC TO F. D. GAVRANOVIC, JR., EXECUTED OCTOBER 29, 1997, RECORDED IN VOLUME 255, PAGE 813 OF THE OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS, (O.R.W.C.T.), SAID 281.346 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:**

**BEGINNING** at an axle found (Grid Coordinates N=9,697,617.94 US Feet, E=3,662,320.72 US Feet) for the northwest corner of said 277.33 acre tract of land and being an interior ell corner of Tract I, a 1059.68 acre tract of land (by deed), described in deed from Henderson Farms, Inc. to Caravelas Company N.V., executed January 3, 1977, recorded in Volume 491, Page 186, D.R.W.C.T.;

**THENCE** North 60 degrees 08 minutes 23 seconds East, with a north line of said 277.33 acre tract of land and with an interior line of said Tract I, passing the northeast line of said Block 70, the southwest line of said Block 47, the northeast line of said Block 47, a 30 foot wide unnamed road as shown on said Re-Subdivision of lands of Missouri-Lincoln Trust Company plat, the southwest line of said Block 38, the east line of said Sylvanus Castleman Survey No. 5, and the west line of said John McCrosky Survey No. 2, in all, a distance of 4859.52 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for an exterior ell corner of said 277.33 acre tract of land and for the easterly northeast corner of said Tract I, said 5/8 inch iron rod with cap stamped "GORRONDONA" also being in a curving south line of Tract No. 2, a 129.3 acre tract of land (by deed), described in deed from Gulf Coast Water Company to Lower Colorado River Authority, executed December 31, 1959, recorded in Volume 318, Page 396, D.R.W.C.T.;

**THENCE**, with a curving north line of said 277.33 acre tract of land and with a curving south line of said 129.3 acre tract of land, along a curve to the left, an arc length of 301.58 feet, having a radius of 458.00 feet, a central angle of 37 degrees 43 minutes 41 seconds, and whose chord bears, North 78 degrees 31 minutes 15 seconds East, a distance of 296.16 feet to a calculated point in water for a point of tangency in a north line of said 277.33 acre tract of land and in the south line of said 129.3 acre tract of land;

**THENCE** North 59 degrees 39 minutes 24 seconds East, with a north line of said 277.33 acre tract of land and with a south line of said 129.3 acre tract of land, a distance of 2263.17 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the westerly northeast corner of said 277.33 acre tract of land and an interior corner of said 129.3 acre tract of land;

**THENCE** with a curving north line of said 277.33 acre tract of land and with a curving south line of said 129.3 acre tract of land, along a curve to the right, an arc length of 426.78 feet, having a radius of 308.00 feet, a central angle of 79 degrees 23 minutes 28 seconds, and whose chord bears South 80 degrees 38 minutes 52 seconds East, a distance of 393.44 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the easterly northeast corner of said 277.33 acre tract of land and an interior corner of said 129.3 acre tract of land;

**THENCE** South 40 degrees 57 minutes 08 seconds East, with the northeast line of said 277.33 acre tract of land and with a south line of said 129.3 acre tract of land, passing at a distance of 1257.06 feet a concrete monument with disc stamped "LCRA SURVEY MARK" (disturbed) found for reference, continuing with the northeast line of said 277.33 acre tract of land, and a south line of said 129.3 acre tract of land, in all, a distance of 1287.76 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the southeast corner of said 277.33 acre tract of land, and for the northeast corner of Tract III, a 379.68 acre tract of land (by deed), described in deed from Henderson Farms, Inc. to Caravelas Company N.V., executed January 3, 1977, recorded in Volume 491, Page 186, D.R.W.C.T., said 5/8 inch iron rod with cap stamped "GORRONDONA" being in the approximate centerline of a 44 foot wide road dedication as shown on said Re-Subdivision of lands of Missouri-Lincoln Trust Company plat, currently known as County Road No. 116 (a/k/a Henry Road) and being in the common block line of said Block 38 and Block 48 of said Re-Subdivision of lands of Missouri-Lincoln Trust Company;

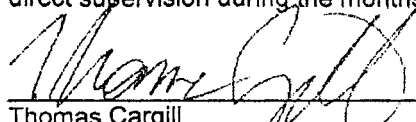
**THENCE** South 59 degrees 50 minutes 29 seconds West, with the south line of said 277.33 acre tract of land, with the north line of said Tract III, with the approximate centerline of said 44 foot wide road currently known as County Road No. 116, with the south line of said Block 38, with the north line of said Block 48, and with the north line of Block 69, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, passing at a distance of 5667.22 feet, a calculated point for the northwest corner of said Tract III and the northeast corner of a 188.90 acre tract of land (by deed), described in deed from John W. Williams and Kimberly J. Williams to Greg A. Koenig and Ronald C. Koenig, executed February 19, 2008, recorded in Volume 733, Page 743, O.R.W.C.T., said calculated point also being the common corner of said Block 47, said Block 70, said Block 69, and Block 71 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, from which a 3/4 inch iron pipe found, bears, North 30 degrees 16 minutes 31 seconds West, a distance of 0.75 feet and from said calculated point, a 5/8 inch iron rod with cap stamped "5319" found in the west line of said Tract III, in the east line of said 188.90 acre tract of land in the west line of said Block 69, and in the east line of said Block 71 bears, South 30 degrees 16 minutes 31 seconds East, a distance of 29.22 feet, continuing with the south line of said 277.33 acre tract of land, with the north line of said 188.90 acre tract of land, with the south line of said Block 70, and with the north line of said Block 71, passing at a distance of 7651.59 feet, a calculated point for the northwest corner of said 188.90 acre tract of land and for the northeast corner of Tract Three, a 188.69 acre tract of land (by deed), described in deed from Joan Reid Anderson and husband, Keith Anderson to Jean Reid Severn, executed November 1, 1979, recorded in Volume 525, Page 612, D.R.W.C.T., from which a 5/8 inch iron rod found (disturbed) in the west line of said 188.90 acre tract of land and in the east line of said 188.69 acre tract of land, bears, South 30 degrees 16 minutes 31 seconds East, a distance of 0.59 feet, and from said calculated point a 5/8 inch iron rod with cap stamped "5319" found in the west line of said 188.90 acre tract of land and in the east line of said 188.69 acre tract of land bears, South 30 degrees 16 minutes 31 seconds East, a distance of 30.57 feet, continuing with the south line of said 277.33 acre tract of land, with the north line of said 188.69 acre tract of land, with the south line of said Block 70, and with the north line of said Block 71, in all, a distance of 7897.26 feet to a 5/8 inch iron rod found for the southwest corner of said 277.33 acre tract of land and for an exterior ell corner of said Tract I;

**THENCE** North 31 degrees 56 minutes 22 seconds West, with the west line of said 277.33 acre tract of land and with an interior line of said Tract I, a distance of 1628.93 feet to the **POINT OF BEGINNING**, and containing 281.346 acres of land, more or less.

Bearing Basis: Texas Lambert Grid, Central Zone, NAD83/NSRS2007.

All distances are surface values and in U. S. Survey Feet. To compute grid values multiply surface distances by a Combined Scale Factor of 1.00037640.

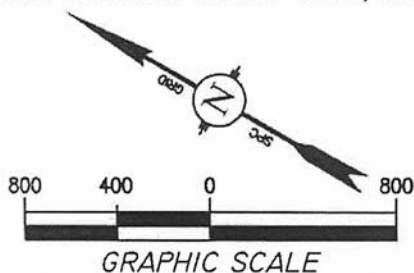
The field notes and the plat attached hereto represent an on-the-ground survey made under my direct supervision during the months of September 2012 to November 2012.

  
Thomas Cargill  
Registered Professional Land Surveyor No. 5835  
Gorrondona and Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933



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WHARTON COUNTY, TEXAS  
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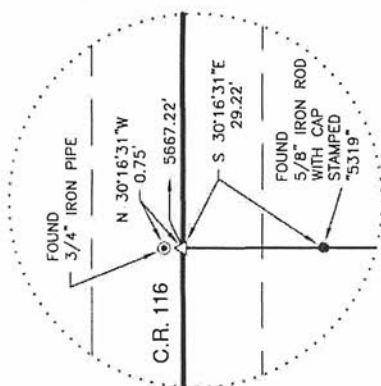


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C-2	RADIUS	DELTA ANGLE	ARC LENGTH
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C-1	CHORD BEARING	CHORD LENGTH	
	N 78°31'15"E	296.16'	
C-2	CHORD BEARING	CHORD LENGTH	
	S 80°38'52"E	393.44'	

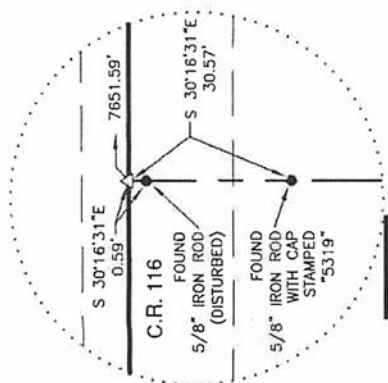
LEGEND

- △ CALCULATED POINT
- ⊙ IRON PIPE FOUND (SIZE NOTED)
- IRON ROD FOUND (SIZE NOTED)
- ⊠ "LCRA" CONCRETE MONUMENT FOUND

D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS  
 O.R.W.C.T. OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS



DETAIL "A"  
(NOT TO SCALE)

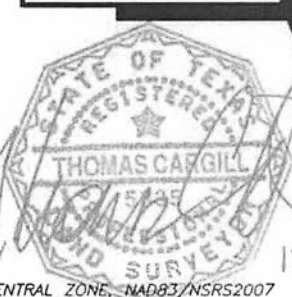


DETAIL "B"  
(NOT TO SCALE)

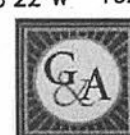
NOTE:  
 SEE PAGE 4 FOR EASEMENT NOTES.

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.

**P.O.B.**  
**281.346 ACRES**



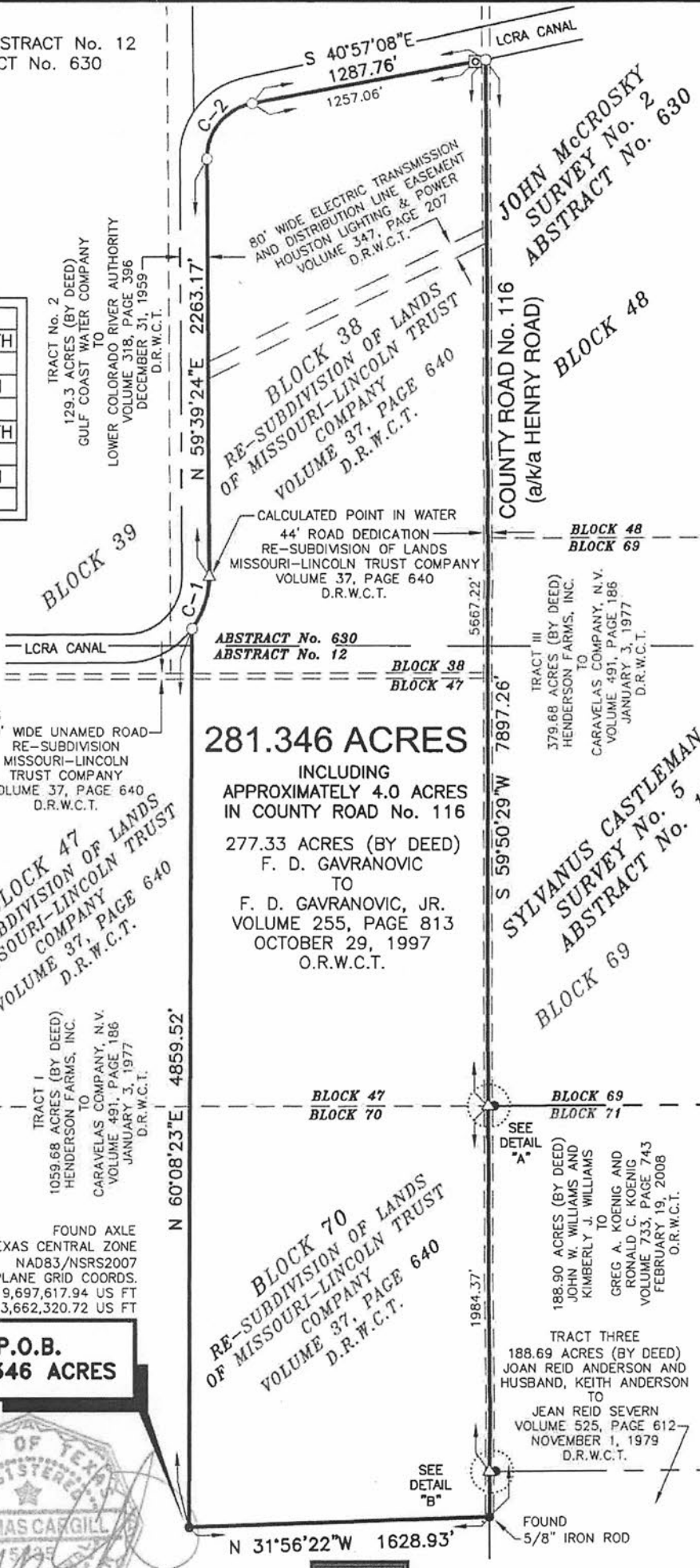
12/17/2012



Gorrondona & Associates, Inc.  
 4201 W. Parmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 719-9933

ACAD FILE: LCRAW114A-0002B.dwg  
 WORD FILE: LCRAW114A-0002B.doc  
 REVISION: 1  
 SCALE: 1"=800'  
 DATE: 12/17/2012  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

281.346 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 5  
 ABSTRACT No. 12  
 JOHN McCROSKY SURVEY No. 2  
 ABSTRACT No. 630  
 WHARTON COUNTY, TEXAS



**281.346 ACRES**  
 INCLUDING  
 APPROXIMATELY 4.0 ACRES  
 IN COUNTY ROAD No. 116  
 277.33 ACRES (BY DEED)  
 F. D. GAVRANOVIC  
 TO  
 F. D. GAVRANOVIC, JR.  
 VOLUME 255, PAGE 813  
 OCTOBER 29, 1997  
 O.R.W.C.T.

JOHN McCROSKY  
 SURVEY No. 2  
 ABSTRACT No. 630

SYLVANUS CASTLEMAN  
 SURVEY No. 5  
 ABSTRACT No. 12

TRACT THREE  
 188.69 ACRES (BY DEED)  
 JOAN REID ANDERSON AND  
 HUSBAND, KEITH ANDERSON  
 TO  
 JEAN REID SEVERN  
 VOLUME 525, PAGE 612  
 NOVEMBER 1, 1979  
 D.R.W.C.T.

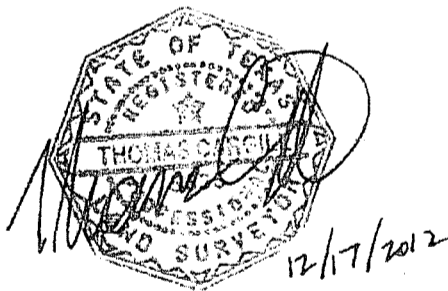
TRACT I  
 1059.68 ACRES (BY DEED)  
 HENDERSON FARMS, INC.  
 TO  
 CARAVELAS COMPANY, N.V.  
 VOLUME 491, PAGE 186  
 JANUARY 3, 1977  
 D.R.W.C.T.

TRACT II  
 379.68 ACRES (BY DEED)  
 HENDERSON FARMS, INC.  
 TO  
 CARAVELAS COMPANY, N.V.  
 VOLUME 491, PAGE 186  
 JANUARY 3, 1977  
 D.R.W.C.T.

WHARTON COUNTY, TEXAS  
SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12  
JOHN McCROSKY SURVEY No. 2, ABSTRACT No. 630

ONLY THESE EASEMENTS LISTED IN LIMITED TITLE CERTIFICATE GF No. 2012-0906  
DATED AUGUST 31, 2012, BY FIRST AMERICAN TITLE INSURANCE COMPANY WERE EVALUATED FOR  
THIS SURVEY EXCEPT AS SHOWN.  
NO OTHER EASEMENT RECORD RESEARCH WAS PERFORMED BY GORRONDONA & ASSOCIATES INC.

Easement Note:  
An 80 foot wide electric transmission and distribution line easement to Houston Power & Light  
recorded in Volume 347, Page 207 of the Deed Records of Wharton County, Texas was provided  
and is shown hereon, however it was not listed in Title Commitment provided.



HORIZONTAL DATUM: NAD83/NSRS2007  
VERTICAL DATUM: NAVD 88  
COMBINED SCALE FACTOR: 1.00037640  
BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.



Gorrondona & Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933

ACAD FILE: LCRAW114A-0002B.dwg  
WORD FILE: LCRAW114A-0002B.doc  
REVISION: 1  
SCALE: 1"=800'  
DATE: 12/17/2012  
WO NO.: 72166  
FIELD BOOK: LCRA2  
DRAWN BY: R. Eckert

281.346 ACRE TRACT OUT OF  
SYLVANUS CASTLEMAN SURVEY No. 5  
ABSTRACT No. 12  
JOHN McCROSKY SURVEY No. 2  
ABSTRACT No. 630  
WHARTON COUNTY, TEXAS

**LCRA**  
ENERGY-WATER-COMMUNITY SERVICES  
3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
(512)473-3200 www.lcra.org

MID-COAST TITLE CO., INC.  
111 N. Fulton  
Wharton, TX 77488

STATE OF TEXAS COUNTY OF WHARTON  
I, hereby certify that this document was filed on the date  
and time stamped and was recorded  
on 07/09/2013 2:43 PM  
2013-00003744  
*Andrea K. Anderson*



COUNTY CLERK, Wharton County, Texas  
By: *[Signature]* Deputy

SCANNED

## **Worksheet 2**

### **Attachment 1:**

#### **Inundated Area Deeds**

**OCL-04**



2013-0503



Doc ID: 003114900007 Type: OFF  
Kind: DEED  
Recorded: 07/01/2013 at 02:44:33 PM  
Fee Amt: \$40.00 Page 1 of 7  
Wharton, TX  
Sandra K. Sanders County Clerk  
File# 2013-00003746

BK **926** PG **328-334**

**General Warranty Deed**

**NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OF THE FOLLOWING INFORMATION FROM THE INSTRUMENT BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVERS LICENSE NUMBER.**

**Date:** June 28, 2013

**Grantor:** Greg A. Koenig, being a married person and Ronald C. Koenig, being a married person  
with homestead elsewhere dealing with homestead elsewhere dealing  
with his separate property with his separate property

**Grantor's Mailing Address:**

Greg A. Koenig and Ronald C. Koenig  
1021 CR 235 1108 Knox Lane  
Wharton, Wharton County, Texas 77488 Wharton, Wharton County, Texas 77488

**Grantee:** Lower Colorado River Authority

**Grantee's Mailing Address:**

Lower Colorado River Authority  
3700 Lake Austin Boulevard  
Austin, Travis County, Texas 78703

**Consideration:**

TEN AND NO/100 DOLLARS (\$10.00) and other good and valuable consideration paid from Grantee's separate property.

**Property (including any improvements):**

Being a 188.898 acre tract of land situated in Sylvanus Castleman survey No. 5, Abstract No. 12, in Wharton County, Texas, said 188.898 acre tract of land being a portion of Block 71, Re-Subdivision of Lands of Missouri-Lincoln Trust Company, as recorded in Volume 37, Page 640 of the Deed Records of Wharton County, Texas (D.R.W.C.T.), said 188.898 acre tract of land being all of a 188.90 acre tract of land (by deed), described in deed from John W. Williams and Kimberly J. Williams to Greg A. Koenig and Ronald C. Koenig, executed February 19, 2008, recorded in Volume 733, Page 743 of the Official Records of Wharton County, Texas (O.R.W.C.T.), said 188.898 acre tract of land being more particularly described by metes and bounds in Exhibit A, attached hereto and incorporated herein.

**Reservations from Conveyance:**

The grantor specifically reserves to himself, his heirs and assigns from this conveyance all of the oil, gas and other minerals under and on this land herein described and conveyed, subject to a separate Waiver of Surface Rights and Drillsite agreement being executed by the grantor and grantee and filed of record in Wharton County Property records.

**Exceptions to Conveyance and Warranty:**

1. Standby fees, taxes and assessments by any taxing authority for the current year, and subsequent years; and subsequent taxes and assessments by any taxing authority for prior years due to change in land usage or

ownership, but not those taxes or assessments for prior years because of an exemption granted to a previous owner of the property under Section 11.13, Texas Tax Code, or because of improvements not assessed for a previous tax year.

2. Any visible or apparent roadway or easement over or across the subject property, the existence of which does not appear of record.
3. Restrictive covenants, easements or encumbrances of record in the Deed Records of Wharton County, Texas.
4. Easement for outfall ditch across Block 71 as show in instrument from J.J. Pendergrass, et ux to Wharton County dated January 12, 1948, and filed in Volume 203, page 109, Deed Records of Wharton County, Texas.
5. That certain royalty interest, as conveyed in perpetuity in instrument dated December 22, 1933, executed by Wharton Development Co. in favor of M.D. Ball, recorded in Volume 106, Page 149 of the Wharton County Deed Records. Title to said royalty interest not checked subsequent to date of aforesaid instrument.
6. That certain mineral interest, the royalties, bonuses, rental and all other rights in connection with said mineral rights, as reserved in perpetuity, under those tracts described in deed dated July 23, 1965, executed by J.N. Pendergrass in favor of Jean Reid Severn, et al, recorded in Volume 368, Page 384 of the Deed Records of Wharton County, Texas. Title to said mineral interest not checked subsequent to date of aforesaid instrument.
7. That certain mineral interest, the royalties, bonuses, rentals and all other rights in connection with said mineral rights, as devised to J.N. Pendergrass in the Last Wills & Testament of J.J. Pendergrass and Ermine Pendergrass, both deceased. Title to said mineral interest not checked subsequent to date of aforesaid instrument.
8. That certain mineral interest, the royalties, bonuses, rental and all other rights in connection with said mineral rights, as reserved in perpetuity in instrument dated October 19, 1979, executed by Jean Reid Severn in favor of Joan Reid Anderson, recorded in Volume 525, Page 605 of the Deed Records of Wharton County, Texas. Title to said mineral interest not checked subsequent to date of aforesaid instrument.
9. Terms, conditions and stipulations of oil, gas, and mineral lease dated February 14, 2004 from John Williams, et ux to Cinco Land & Exploration, Inc., recorded in Volume 574, Page 188 of the Wharton County Official Records. Title to said leasehold interest not checked subsequent to the date of aforesaid instrument.
10. Terms, conditions, and stipulations of oil, gas and mineral lease dated January 22, 2003 from John W. Williams, et ux to Osborn Heirs Co., recorded in Volume 435, Page 739 of the Wharton County Official Records. Title to said leasehold interest not checked subsequent to the date of aforesaid instrument.
11. Terms, conditions and stipulations of oil, gas and mineral lease dated October 11, 2007 from John Williams, et ux to Ballard Exploration Co., Inc., recorded in Volume 720, Page 651 of the Wharton County Official Records. Title to said leasehold interest not checked subsequent to the date of aforesaid instrument.

Grantor, for the Consideration and subject to the Reservations from Conveyance and the Exceptions to Conveyance and Warranty, grants, sells, and conveys to Grantee the Property, together with all and singular the rights and appurtenances thereto in any way belonging, to have and to hold it to Grantee and Grantee's heirs, successors, and assigns forever. Grantor binds Grantor and Grantor's heirs and successors to warrant and forever defend all and singular the Property to Grantee and Grantee's heirs, successors, and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof, except as to the Reservations from Conveyance and the Exceptions to Conveyance and Warranty.



When the context requires, singular nouns and pronouns include the plural.

*Greg A. Koenig*  
\_\_\_\_\_  
Greg A. Koenig

STATE OF TEXAS §  
COUNTY OF WHARTON §

This instrument was acknowledged before me on June 28 2013, by Greg A. Koenig, known to me to be the person whose name is subscribed to the forgoing instrument, and acknowledged to me that Grantor executed same for the purposes and consideration therein expressed, and in the capacities there in stated.

*Laurianne Rachunek*  
\_\_\_\_\_  
Notary Public, State of Texas



*Ronald C. Koenig*  
\_\_\_\_\_  
Ronald C. Koenig

STATE OF TEXAS §  
COUNTY OF WHARTON §

This instrument was acknowledged before me on June 28 2013, by Ronald C. Koenig, known to me to be the person whose name is subscribed to the forgoing instrument, and acknowledged to me that Grantor executed same for the purposes and consideration therein expressed, and in the capacities there in stated.



*Laurianne Rachunek*  
\_\_\_\_\_  
Notary Public, State of Texas

PREPARED IN THE LAW OFFICE OF:

Howard H. Singleton  
Singleton Law Firm  
109 E. Milam  
Wharton, Texas 77488  
Phone (979) 532-9800  
Fax (979) 532-9805

EXHIBIT "A"

**BEING A 188.898 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12, IN WHARTON COUNTY, TEXAS, SAID 188.898 ACRE TRACT OF LAND BEING A PORTION OF BLOCK 71, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 188.898 ACRE TRACT OF LAND BEING ALL OF A 188.90 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM JOHN W. WILLIAMS AND KIMBERLY J. WILLIAMS TO GREG A. KOENIG AND RONALD C. KOENIG, EXECUTED FEBRUARY 19, 2008, RECORDED IN VOLUME 733, PAGE 743 OF THE OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS (O.R.W.C.T.), SAID 188.898 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:**

**BEGINNING** at a calculated point (Grid Coordinates N=9,697,355.84 US Feet, E=3,665,111.70 US Feet) for the north corner of said 188.90 acre tract of land and for the west corner of Tract III, a 379.68 acre tract of land (by deed), described in deed from Henderson Farms, Inc. to Caravelas Company, N.V., executed January 3, 1977, recorded in Volume 491, Page 186, D.R.W.C.T., said point being in the southeast line of a 277.33 acre tract of land (by deed), described in deed from F. D. Gavranovic to F. D. Gavranovic, Jr., executed October 29, 1997, recorded in Volume 255, Page 813 of the Official Records of Wharton County, Texas (O.R.W.C.T.) said point also being the common corner of Block 70, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, Block 47, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, Block 69, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, and said Block 71, said point also being in the approximate centerline of a 44 foot wide road dedication as shown on said Re-Subdivision of lands of Missouri-Lincoln Trust Company plat, currently known as County Road No. 116 (a/k/a Henry Road), from which a 3/4 inch iron pipe found for reference bears, North 30 degrees 16 minutes 31 seconds West, a distance of 0.76 feet;

**THENCE** South 30 degrees 16 minutes 31 seconds East, with the northeast line of said 188.90 acre tract of land, with the southwest line of said Tract III, with the northeast line of said Block 71, and with the southwest line of said Block 69, passing at a distance of 29.22 feet, a 5/8 inch iron rod with cap stamped "5319" found for reference, passing at a distance of 2663.76 feet, a 5/8 inch iron rod with cap stamped "5319" found for reference, passing at a distance of 2772.97 feet, a 1-1/4 inch iron pipe found for the south corner of said Tract III and for the west corner of First Tract, a 163.299 acre tract of land (by deed), described in deed from Oldrich J. Hlavinka and wife, Bessie Hlavinka to James J. Hlavinka and wife, Annette J. Hlavinka, executed August 23, 1977, recorded in Volume 486, Page 267, D.R.W.C.T., said 1-1/4 inch iron pipe also being the south corner of said Block 69 and being the west corner of Block 68, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, continuing with the northeast line of said 188.90 acre tract of land, with the southwest line of said First Tract, with the northeast line of said Block 71, and with the southwest line of said Block 68, passing at a distance of 3961.36 feet, a calculated point for the south corner of said First Tract and for the west corner of a 163.299 acre tract of land (by deed), described in deed from Oldrich J. Hlavinka and wife, Bessie Hlavinka to William J. Hlavinka, Jos. C. Hlavinka, Jr., Charles J. Hlavinka, Victor F. Hlavinka, Donna Hlavinka Schier, and Carol Hlavinka Powitzky, executed April 29, 1977, recorded in Volume 732, Page 603, D.R.W.C.T., continuing with the northeast line of said 188.90 acre tract of land, with the southwest line of said 163.299 acre tract of land, with the northeast line of said Block 71, and with the southwest line of said Block 68, in all, a distance of 4146.64 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the east corner of said 188.90 acre tract of land and for the north corner of a 20 acre tract of land (by deed), described in deed from Alan Lockley and wife, Lillian Marie Lockley, and Frank J. Felcman and wife, Judy Felcman to C. M. Pumphrey, Jr., executed January 30, 1976, recorded in Volume 462, Page 4, D.R.W.C.T., said 5/8 inch iron rod with cap stamped "GORRONDONA" also being the east corner of said Block 71 and the north corner of Block 104, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, from which a 5/8 inch iron rod with cap stamped "5319" found for reference bears, North 00 degrees 26 minutes 53 seconds East, a distance of 5.29 feet;

**THENCE** South 59 degrees 42 minutes 23 seconds West, with the southeast line of said 188.90 acre tract of land, with the northwest line of said 20 acre tract of land, with the southeast line of said Block 71, and with the northwest line of said Block 104, passing at a distance of 830.20 feet, a calculated point for the west corner of said 20 acre tract of land and for an exterior ell corner of a 562.205 acre tract of land (by deed), described in deed from Maxim Productions Co., LP to DCVK Limited Partnership, executed May 9, 2005, recorded in Volume 607, Page 247, O.R.W.C.T., continuing with the southeast line of said 188.90 acre tract of land, with the northwest line of said 562.205 acre tract of land, with the southeast line of said Block 71, and with the northwest line of said Block 104, in all, a distance of 1982.14 feet, to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the south corner of said 188.90 acre tract of land and for the east corner of Tract Three, a 188.69 acre tract of land (by deed), described in deed from Joan Reid Anderson and husband, Keith Anderson to Jean Reid Severn, executed November 1, 1979, recorded in Volume 525, Page 612, D.R.W.C.T.;

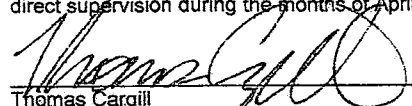
**THENCE** North 30 degrees 18 minutes 21 seconds West, with the southwest line of said 188.90 acre tract of land and with the northeast line of said Tract Three, passing at a distance of 850.73 feet, a 5/8 inch iron rod with cap stamped "5319" found for reference, passing at a distance of 2587.63 feet, a 5/8 inch iron rod with cap stamped "5319" found for reference, passing at a distance of 4120.75 feet, a 5/8 inch iron rod with cap stamped "5319" found for reference, passing at a distance of 4150.73 feet a 5/8 inch iron rod (disturbed) found for reference, in all, a distance of 4151.32 feet to a calculated point in the south line of said 277.33 acre tract of land, for the west corner of said 188.90 acre tract of land and for the north corner of said Tract Three, said point being in the northwest line of said Block 71 and being in the southeast line of said Block 70, said point also being in the approximate centerline of said County Road No. 116;

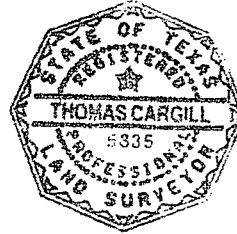
**THENCE** North 59 degrees 50 minutes 29 seconds East, with the northwest line of said 188.90 acre tract of land, with the southeast line of said 277.33 acre tract of land, with the northwest line of said Block 71, with the southeast line of said Block 70, and with the approximate centerline of County Road No. 116, a distance of 1984.35 feet to the **POINT OF BEGINNING**, and containing 188.898 acres of land, more or less.

Bearing Basis: Texas Lambert Grid, Central Zone, NAD83/NSRS2007.

All distances are surface values and in U. S. Survey Feet. To compute grid values multiply surface distances by a Combined Scale Factor of 1.00037640.

The field notes and the plat attached hereto represent an on-the-ground survey made under my direct supervision during the months of April 2013 to May 2013.

  
Thomas Cargill  
Registered Professional Land Surveyor No. 5835  
Gorrondonga and Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933

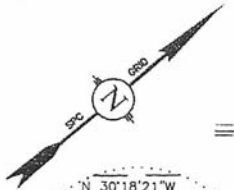


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Drawing File: LCRAW114A-00011A.DWG

WHARTON COUNTY, TEXAS  
SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12



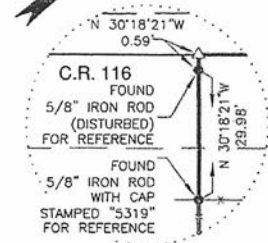
GRAPHIC SCALE



277.33 ACRES (BY DEED)  
F. D. GAVRANOVIC  
TO  
F. D. GAVRANOVIC, JR.  
VOLUME 255, PAGE 813  
O.R.W.C.T.  
44' ROAD DEDICATION  
RE-SUBDIVISION OF LANDS OF  
MISSOURI-LINCOLN  
TRUST COMPANY  
VOLUME 37, PAGE 640  
D.R.W.C.T.  
SEE  
DETAIL  
"A"

LEGEND

- ⊙ IRON PIPE FOUND (SIZE NOTED)
- 5/8" IRON ROD WITH CAP STAMPED "GORRONDONA" SET
- △ CALCULATED POINT
- IRON ROD FOUND (SIZE NOTED)
- D.R.W.C.T. DEED RECORDS OF WHARTON COUNTY, TEXAS
- O.R.W.C.T. WHARTON COUNTY, TEXAS
- OFFICIAL RECORDS OF WHARTON COUNTY, TEXAS
- WHARTON COUNTY, TEXAS



DETAIL "A"  
(NOT TO SCALE)

FOUND  
5/8" IRON ROD WITH CAP  
STAMPED "5319"  
FOR REFERENCE  
  
TRACT THREE  
188.69 ACRES (BY DEED)  
JOAN REID ANDERSON AND HUSBAND,  
KEITH ANDERSON  
TO  
JEAN REID SEVERN  
VOLUME 525, PAGE 612  
NOVEMBER 1, 1979  
D.R.W.C.T.



**SYLVANUS  
CASTLEMAN  
SURVEY No. 5  
ABSTRACT No. 12**

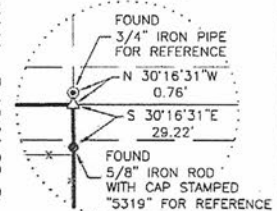
**188.898 ACRES**

188.90 ACRES (BY DEED)  
JOHN W. WILLIAMS AND KIMBERLY J. WILLIAMS  
TO  
GREG A. KOENIG AND RONALD C. KOENIG  
VOLUME 733, PAGE 743  
FEBRUARY 19, 2008  
O.R.W.C.T.

**P.O.B.  
188.898 ACRES**

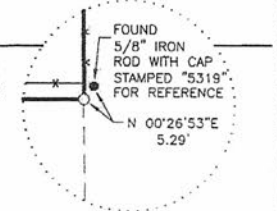
CALCULATED POINT  
TEXAS CENTRAL ZONE  
NAD83/NSRS2007  
STATE PLANE GRID COORDS.  
GRID N: 9,697,355.84 US FT  
GRID E: 3,665,111.70 US FT

TRACT III  
379.68 ACRES (BY DEED)  
HENDERSON FARMS, INC.  
TO  
CARAVELAS COMPANY, N.V.  
VOLUME 491, PAGE 186  
JANUARY 3, 1977  
D.R.W.C.T.



DETAIL "B"  
(NOT TO SCALE)

FOUND  
3/4" IRON PIPE  
FOR REFERENCE  
  
FIRST TRACT  
163.299 ACRES (BY DEED)  
OLDRICH J. HLAVINKA AND WIFE,  
BESSIE HLAVINKA  
TO  
JAMES J. HLAVINKA AND WIFE,  
ANNETTE J. HLAVINKA  
VOLUME 486, PAGE 267  
AUGUST 23, 1977  
D.R.W.C.T.



DETAIL "C"  
(NOT TO SCALE)

SEE PAGE 4 FOR  
OWNERSHIP INFORMATION  
OF 163.299 ACRE TRACT OF LAND

HORIZONTAL DATUM: NAD83/NSRS2007  
VERTICAL DATUM: NAVD 88  
COMBINED SCALE FACTOR: 1.00037640  
BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.

NOTE:  
SEE PAGE 4 FOR EASEMENT NOTES.



Gorrondona & Associates, Inc.  
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ACAD FILE: LCRAW114A-00011A.dwg  
WORD FILE: LCRAW114A-00011A.doc  
REVISION: N/A  
SCALE: 1"=600'  
DATE: 6/5/2013  
WO NO.: 72166  
FIELD BOOK: LCRA2  
DRAWN BY: R. Eckert

188.898 ACRE TRACT OUT OF  
SYLVANUS CASTLEMAN SURVEY No. 5  
ABSTRACT No. 12  
WHARTON COUNTY, TEXAS



WHARTON COUNTY, TEXAS  
SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12

ONLY THESE EASEMENTS LISTED IN LIMITED TITLE CERTIFICATE GF No. 2013-0503 DATED APRIL 23, 2013, BY FIRST AMERICAN TITLE INSURANCE COMPANY WERE EVALUATED FOR THIS SURVEY.  
NO OTHER EASEMENT RECORD RESEARCH WAS PERFORMED BY GORRONDONA & ASSOCIATES INC.

- c. Easement for outfall ditch across Block 71 as shown in instrument from J.J. Pendergrass, et ux to Wharton County, dated January 12, 1948 and filed in Volume 203, Page 109, Deed Records of Wharton County, Texas. (Does affect subject tract and is shown hereon)



163.299 ACRES (BY DEED)  
 OLDRICH J. HLAVINKA AND WIFE, BESSIE HLAVINKA  
 TO  
 WILLIAM J. HLAVINKA, JOS. C. HLAVINKA, JR.,  
 CHARLES J. HLAVINKA, VICTOR F. HLAVINKA,  
 DONNA HLAVINKA SCHIER AND CAROL HLAVINKA POWITZKY  
 VOLUME 732, PAGE 603  
 APRIL 29, 1977  
 D.R.W.C.T.



HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.



Gorrondona & Associates, Inc.  
 4201 W. Parmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 719-9933

ACAD FILE: LCRAW114A-00011A.dwg  
 WORD FILE: LCRAW114A-00011A.doc  
 REVISION: N/A  
 SCALE: 1"=600'  
 DATE: 6/5/2013  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

188.898 ACRE TRACT OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 5  
 ABSTRACT No. 12  
 WHARTON COUNTY, TEXAS

**LCRA**  
 ENERGY-WATER-COMMUNITY SERVICES  
 3700 LAKE AUSTIN BLVD. AUSTIN, TX 78703  
 (512)473-3200 www.lcra.org

Mid-Coast Title Co  
 111 N. Fulton  
 Wharton, TX 77488

SCANNED

STATE OF TEXAS COUNTY OF WHARTON  
 I, hereby certify that this document was filed on the date  
 and time stamped and was recorded  
 on 07/07/2013 2:44 PM

*Madra K. Anderson*  
 COUNTY CLERK, Wharton County, Texas  
 By: \_\_\_\_\_ Deputy





2013-0503

**NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OF THE FOLLOWING INFORMATION FROM THIS INSTRUMENT BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.**

**WAIVER OF SURFACE RIGHTS AND  
DESIGNATION OF DRILLSITES**



Doc ID: 003114910011 Type: OFF  
Kind: WAIVER  
Recorded: 07/01/2013 at 02:45:01 PM  
Fee Amt: \$56.00 Page 1 of 11  
Wharton, TX  
Sandra K. Sanders County Clerk  
File# 2013-00003747

BK **926** PG **335-345**

**Date:** JUNE 28, 2013

**Grantor:** GREG A. KOENIG and RONALD C. KOENIG

**Grantor's Mailing Address:** 2305 N. Richmond Road  
Wharton, Texas 77488

**Grantee:** LOWER COLORADO RIVER AUTHORITY

**Grantee's Mailing Address:** P. O. Box 220  
Austin, Texas 78767

**Consideration:** TEN (\$10.00) DOLLARS cash and other valuable consideration paid by Grantee to GRANTOR, the receipt of which is hereby acknowledged and confessed, GRANTOR.

**Property (including any improvements):** That certain 188.899-acre site that is the subject of a Real Estate Contract dated May 6, 2013, by and between Grantor and Grantee and described in Exhibit A thereto.

**Drillsites:** Those two five-acre tracts of land designated and described as Tract 1 and Tract 2 on Exhibit 1, which is attached hereto and incorporated herein for all purposes.

Grantee warrants that it has good and indefeasible title in fee simple to the Drillsites and all land between the Drillsites and the Property to allow for direction drilling from the Drillsites to the Property and that such title is free from any type of restriction that would hamper Grantor from fully utilizing the Drillsites for the purposes described herein; provided, however, that use of the Drillsites will be shared with other mineral producers, and Grantor's use of the Drillsites will be non-exclusive.

**Waiver of Surface Usage and Designation of Drillsite Locations:**

In order to provide for the development of the surface of the Property, and for the consideration above specified Grantor further grants to Grantee all of Grantor's rights to use

and/or come upon the surface of the Property to drill for or produce and otherwise utilize the minerals reserved by Grantor, and Grantor waives all of its rights (except as hereinafter specified) to use the surface of the Property, for all purposes, including, but not limited to, the exploration for and/or development of the minerals reserved by Grantor through any method then or thereafter known or used; provided, however, that Grantor shall have the right and retains for itself and its successors-in-interest, all rights to explore for, to drill and produce oil, gas and other minerals underlying or situated 500 feet or more below the surface of Property by those means that do not use the surface of the Property or interfere with the use of the surface of the Property, including wells directionally drilled from surface locations on nearby lands (including the designated Drillsites) and by pooling or unitizing all or part of the Property with nearby lands to the extent oil and gas operations may be conducted. The Grantor specifically reserves the right to perform across the Property seismograph or vibrosize studies to explore for oil, gas and minerals, but only to the extent that such studies do not interfere with Grantee's use of the Property for its own purposes.

For and in consideration of the waiver of rights to use the surface of the Property provided in the preceding paragraph, Grantee hereby covenants and agrees with Grantor as follows:

a. Designation of Drillsite. Notwithstanding the matter set forth above, Grantor, for itself, shall have the non-exclusive right (together with Grantee and other mineral owners and/or lessees of mineral owners, if any) to use the surface of the Drillsites for the exploration of, development of, drilling and initial and ongoing production, pumping, and transfer of oil, gas and other minerals in and under the Property. Grantor shall have the right to develop, drill for, and produce Grantor's mineral estate lying 500 feet or more below the surface of the Property including but not limited to, oil, gas and other minerals through the bores of wells drilled on the Drillsite and/or through any method then or thereafter known or used, but only to the extent such other method does not interfere with Grantee's use of the Property. In no event shall Grantor, or its, successors, legal representatives or assigns, ever have the right to develop and produce said minerals, oil, gas or other hydrocarbons from the surface of the Property in any manner provided, however, that the surface of the Drillsites may be used in combination with the surface of adjacent property owned by Grantor, if any, for joint production from the Drillsite or from wellsites located on such adjacent property. Upon commencement of operations upon the Drillsite, Grantee may require the mineral Lessee or operator to fence the Drillsite to separate the same from the other property of Grantee using four strands of barbed wire except for those fences which are also outside boundary fences for the entire tract. For such boundary fences, the materials shall be the same as the boundary fence. The mineral Lessee shall install a gate for each Drillsite used. Following the completion of drilling and assuming Grantor's intention to undertake production efforts, all activities associated with initial and ongoing production will be permitted on, but limited to production improvements located on the Drillsite, including, but not limited to above ground improvements necessary and typical in the industry for production, pumping and transferring of minerals, oil, gas and other similar hydrocarbons (including meter and dehydration structures necessary for gathering line transportation purposes), subject to the aforesaid provision that the surface of the Drillsite may be used in combination with the surface of adjacent property owned by Grantor, if any, for joint production from wellsites located on such adjacent property. Notwithstanding anything herein to the contrary, Grantor's right to



develop, drill for, and produce minerals, oil, gas and other hydrocarbons underlying or situated beneath the Property is limited to those minerals, oil, gas and other hydrocarbons lying 500 feet or more below the surface of the Property as it exists as of the date hereof.

b. Access Rights/Gathering Line Rights. In addition to the rights afforded Grantor in Paragraph a. above, GRANTEE agrees to provide adequate access across Grantee's property to and from the Drillsites to allow Grantor to run gathering lines, pipelines and/or to fully use the Drillsites for the purposes set out herein.

c. Directional Drilling. Grantor and Grantee confirm that Grantor shall have the right to explore for and develop the minerals retained by Grantor through directional drilling or through any method or technology then or thereafter known or used from the Drillsite or from surface locations in the vicinity of the Property, but not on the surface of the Property absent specific written permission from Grantee. Grantor shall not authorize any activity which will impair the subsurface support of the property outside the Drillsites.

d. Non-Combination. Grantor for itself and its successors, legal representatives, and assigns, including any lessees of the mineral estate reserved by Grantor to their successors and assigns, covenant and agree not to use the surface of the Property through any rights obtained from the undivided mineral interests in the Property owned by persons other than the Grantor, which covenant is a covenant running with the land and with any mineral interest reserved by Grantor and is binding upon the owner of any part of the mineral interest reserved by Grantor and any lessee thereof.

e. Covenants. The covenants contained herein are for the benefit of the Property and the mineral interests in and under the Property reserved by Grantor herein and shall be covenants running with the Property and shall be binding upon and shall inure to the benefit of Grantor and Grantee, and their respective successors, legal representatives, heirs and assigns.

f. Hunting and Fishing. Grantor shall not have the right to use the Drillsites or the Property for hunting or fishing purposes or to grant such permission to anyone.

g. Assignment of Claim. In the event that Grantor's mineral Lessee shall discharge saltwater or substances classified by a governmental agency as harmful to the land on Grantee's property, or otherwise damage Grantee's or Grantee's assigns' property and roads purchased from Grantor, then Grantor, in exchange for a complete release of liability executed by Grantee or Grantee's assigns to Grantor, the Grantor will assign its claims for breach of contract and damages for the harm to Grantee's property to Grantee or Grantee's assigns.

h. Electrical Power. Grantee agrees that no electric power line poles may be placed upon the surface of the Drillsites.

This agreement may be executed in multiple counterparts, each of which shall be binding upon the signing part or parties thereto as fully as if all parties had executed one instrument, and all such counterparts shall constitute one and the same instrument. The signature pages of the parties as affixed to the counterparts may be combined, treated and given effect for all purposes,

including recordation, into one single instrument.

The Grantee hereby accepts this Waiver of Surface Rights and Designation of Drillsites subject to the conditions, reservations and exceptions contained herein.

When the context requires singular nouns and pronouns include the plural.

**GRANTOR:**

  
\_\_\_\_\_  
GREG A. KOENIG

  
\_\_\_\_\_  
RONALD C. KOENIG

**GRANTEE:**

**LOWER COLORADO RIVER AUTHORITY**

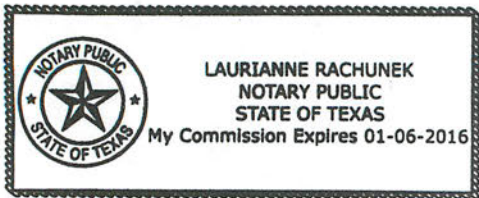
By:   
\_\_\_\_\_  
Fredrick E. Crawford, Manager of Real Estate Services

ACKNOWLEDGMENTS

THE STATE OF TEXAS

COUNTY OF WHARTON

On this 28 day of June, 2013, before me personally appeared GREG A. KOENIG, to me known to be the person described in and who executed the foregoing instrument, and acknowledged that he executed the same as his free act and deed.



Laurianne Rachunek  
NOTARY PUBLIC, STATE OF TEXAS

THE STATE OF TEXAS

COUNTY OF Wharton

On this 28 day of June, 2013, before me personally appeared RONALD C. KOENIG, to me known to be the person described in and who executed the foregoing instrument, and acknowledged that he executed the same as his free act and deed.

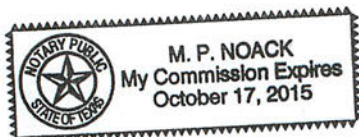


Laurianne Rachunek  
NOTARY PUBLIC, STATE OF TEXAS

THE STATE OF TEXAS

COUNTY OF TRAVIS

On this 28 day of June, 2013, before me personally Fredrick E. Crawford, Manager of Real Estate Services of the **LOWER COLORADO RIVER AUTHORITY**, to me known to be the person described in and who executed the foregoing instrument, and acknowledged that he executed the same as his free act and deed, in the capacity therein stated.



M P Noack  
NOTARY PUBLIC, STATE OF TEXAS

**After recording, return to:**

**LCRA  
Attn: Melvin Noack  
P.O. Box 220  
Austin, Texas 78767**

**EXHIBIT " 1 "**

**TRACT 1**

**BEING A 5.000 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12 IN WHARTON COUNTY, TEXAS, SAID 5.000 ACRE TRACT OF LAND BEING A PORTION OF LOT 1, BLOCK 102, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 5.000 ACRE TRACT OF LAND ALSO BEING A PORTION OF TRACT I, A 1059.68 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM HENDERSON FARMS, INC. TO CARAVELAS COMPANY, N.V., EXECUTED JANUARY 3, 1977, RECORDED IN VOLUME 491, PAGE 186, D.R.W.C.T., SAID 5.000 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:**

**COMMENCING** at a 5/8 inch iron rod found for an exterior ell corner of said Tract I and for the south corner of a 277.33 acre tract of land (by deed), described in deed from F. D. Gavranovic to F. D. Gavranovic, Jr., executed October 29, 1997, recorded in Volume 255, Page 813 of the Official Records of Wharton County, Texas, (O.R.W.C.T.), said 5/8 inch iron rod being in the south line of Block 70 and being in the north line of Block 71, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, said 5/8 inch iron rod being in the north line of Tract Three, a 188.69 acre tract of land (by deed), described in deed from Joan Reid Anderson and husband, Keith Anderson to Jean Reid Severn, executed November 1, 1979, recorded in Volume 525, Page 612, D.R.W.C.T. and also being in the approximate centerline of County Road No. 116 (a/k/a Henry Road); **THENCE** South 59 degrees 50 minutes 29 seconds West, with an interior line of said Tract I, with the north line of said Tract Three, with the south line of said Block 70, with the north line of said Block 71, and with the approximate centerline of said County Road No. 116 passing at a distance of 1914.13 feet, a 5/8 inch iron rod with cap stamped "GORRONDONA" found for reference, in all, a distance of 1964.13 feet to a calculated point in the approximate centerline of Jarvis Creek, for an interior ell corner of said Tract I and for the west corner of said Tract Three; **THENCE** South 39 degrees 26 minutes 31 seconds West (radial bearing), a distance of 358.32 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the **POINT OF BEGINNING** (Grid Coordinates N=9,694,971.10 US Feet, E=3,661,256.17 US Feet);

**THENCE** South 30 degrees 14 minutes 06 seconds East, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

**THENCE** South 59 degrees 45 minutes 54 seconds West, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

**THENCE** North 30 degrees 14 minutes 06 seconds West, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

**THENCE** North 59 degrees 45 minutes 54 seconds East, a distance of 466.69 feet to the **POINT OF BEGINNING** and containing 5.000 acres of land, more or less.



**TRACT 2**

**BEING A 5.000 ACRE TRACT OF LAND SITUATED IN SYLVANUS CASTLEMAN SURVEY No. 5, ABSTRACT No. 12 IN WHARTON COUNTY, TEXAS, SAID 5.000 ACRE TRACT OF LAND BEING A PORTION OF LOT 4, BLOCK 102, AND LOT 5, BLOCK 102, RE-SUBDIVISION OF LANDS OF MISSOURI-LINCOLN TRUST COMPANY, AS RECORDED IN VOLUME 37, PAGE 640 OF THE DEED RECORDS OF WHARTON COUNTY, TEXAS (D.R.W.C.T.), SAID 5.000 ACRE TRACT OF LAND ALSO BEING A PORTION OF TRACT I, A 1059.68 ACRE TRACT OF LAND (BY DEED), DESCRIBED IN DEED FROM HENDERSON FARMS, INC. TO CARAVELAS COMPANY, N.V., EXECUTED JANUARY 3, 1977, RECORDED IN VOLUME 491, PAGE 186, D.R.W.C.T., SAID 5.000 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:**

**COMMENCING** at a 5/8 inch iron rod found for an exterior ell corner of said Tract I and for the south corner of a 277.33 acre tract of land (by deed), described in deed from F. D. Gavranovic to F. D. Gavranovic, Jr., executed October 29, 1997, recorded in Volume 255, Page 813 of the Official Records of Wharton County, Texas, (O.R.W.C.T.), said 5/8 inch iron rod being in the south line of Block 70 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company and in the north line of Block 71 of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company, said 5/8 inch iron rod being in the north line of Tract Three, a 188.69 acre tract of land (by deed), described in deed from Joan Reid Anderson and husband, Keith Anderson to Jean Reid Severn, executed November 1, 1979, recorded in Volume 525, Page 612, D.R.W.C.T., and also being in the approximate centerline of County Road No. 116 (a/k/a Henry Road), from which a 5/8 inch iron rod with cap stamped "GORRONDONA" found for reference in an interior line of said Tract I and in the north line of said Tract Three, bears, South 59 degrees 50 minutes 29 seconds West, a distance of 1914.13 feet; THENCE North 59 degrees 50 minutes 29 seconds East, with the south line of said 277.33 acre tract of land, with the north line of said Tract Three, with the south line of said Block 70, with the north line of said Block 71, and with the approximate centerline of said County Road No. 116, a distance of 245.69 feet to a calculated point for the north corner of said Tract Three and for the west corner of a 188.90 acre tract of land (by deed), described in deed from John W. Williams and Kimberly J. Williams to Greg A. Koenig and Ronald C. Koenig, executed February 19, 2008, recorded in Volume 733, Page 743, O.R.W.C.T.; THENCE South 30 degrees 18 minutes 21 seconds East, with the northeast line of said Tract Three and with the southwest line of said 188.90 acre tract of land, passing at a distance of 0.59 feet, a 5/8 inch iron rod (disturbed) found for reference, passing at a distance of 30.57 feet, a 5/8 inch iron rod with cap stamped "5319" found for reference, in all, a distance of 4151.32 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" found for the east corner of said Tract Three and for the south corner of said 188.90 acre tract of land, said 5/8 inch iron rod with cap stamped "GORRONDONA" being in the north line of a 562.205 acre tract of land (by deed), described in deed from Maxim Productions Co., LP to DCVK Limited Partnership, executed May 9, 2005, recorded in Volume 607, Page 247, O.R.W.C.T., said 5/8 inch iron rod with cap stamped "GORRONDONA" being in the south line of said Block 71 and also being in the north line of Block 104, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company; THENCE South 59 degrees 42 minutes 23 seconds West, with the south line of said Tract Three, with the south line of said Block 71, with the north line of said 562.205 acre tract of land, and with the north line of said Block 104, passing at a distance of 1868.89 feet, a 1/2 inch iron pipe with cap stamped "KALKOMEY" found for reference, in all, a distance of 1944.02 feet to a calculated point in the approximate centerline of Jarvis Creek, said point being the southwest corner of said Block 71 and the northwest corner of said Block 104, said point being in the southeast line of Block 102, of said Re-Subdivision of Lands of Missouri-Lincoln Trust Company and also being in an interior line of said Tract I; THENCE South 65 degrees 19 minutes 22 seconds West (radial bearing), a distance of 457.71 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for the **POINT OF BEGINNING** (Grid Coordinates N=9,691,601.02 US Feet, E=3,663,395.65 US Feet);

**THENCE** South 59 degrees 45 minutes 54 seconds West, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

**THENCE** North 30 degrees 14 minutes 06 seconds West, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

**THENCE** North 59 degrees 45 minutes 54 seconds East, a distance of 466.69 feet to a 5/8 inch iron rod with cap stamped "GORRONDONA" set for corner;

**THENCE** South 30 degrees 14 minutes 06 seconds East, a distance of 466.69 feet to the **POINT OF BEGINNING**, and containing 5.000 acres of land, more or less.



Bearing Basis: Texas Lambert Grid, Central Zone, NAD83/NSRS2007.

All distances are surface values and in U. S. Survey Feet. To compute grid values multiply surface distances by a Combined Scale Factor of 1.00037640.

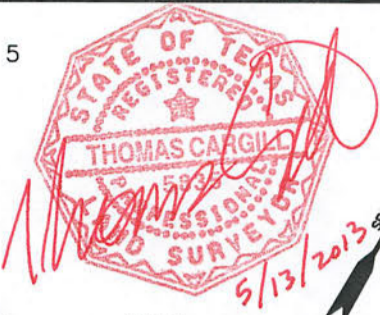
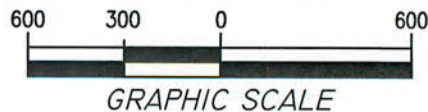
The field notes and the plat attached hereto represent an on-the-ground survey made under my direct supervision during the months of March 2013 to April 2013.

  
\_\_\_\_\_  
Thomas Cargill  
Registered Professional Land Surveyor No. 5835  
Gorronдона and Associates, Inc.  
4201 W. Parmer Lane, Bldg. B, Suite 100  
Austin, Texas 78727  
(512) 719-9933



Word File: LCRAW114A-00010A.DOC  
Drawing File: LCRAW114A-00010A.DWG

WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 5  
 ABSTRACT No. 12



LOT 5 SET  
 5/8" IRON ROD WITH CAP  
 STAMPED "GORRONDONA"  
 TEXAS CENTRAL ZONE  
 NAD83/NSRS2007  
 STATE PLANE GRID COORDS.  
 GRID N: 9,694,971.10 US FT  
 GRID E: 3,661,256.17 US FT

**P.O.B.  
 TRACT 1  
 5.000 ACRES**

**P.O.C.  
 TRACT 1 &  
 TRACT 2**

277.33 ACRES (BY DEED)  
 F. D. GAVRANOVIC  
 TO  
 F. D. GAVRANOVIC, JR.  
 VOLUME 255, PAGE 813  
 OCTOBER 29, 1997  
 O.R.W.C.T.

LOT 6

BLOCK 101 BLOCK 70 S 59°50'29"W 1914.13' BLOCK 70

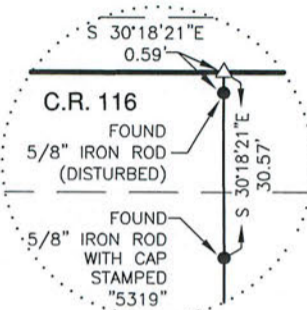
BLOCK 103 L-5 (RADIAL BEARING) S 59°50'29"W 1964.13' BLOCK 71

LOT 1 TRACT 1  
 5.000 ACRES

COUNTY ROAD No. 116  
 (a/k/a HENRY ROAD)

SEE  
 DETAIL  
 "A"

44' ROAD DEDICATION  
 RE-SUBDIVISION  
 MISSOURI-LINCOLN  
 TRUST COMPANY  
 VOLUME 37, PAGE 640  
 D.R.W.C.T.



APPROXIMATE CL  
 OF JARVIS CREEK

SYLVANUS CASTLEMAN  
 SURVEY No. 5  
 ABSTRACT No. 12

TRACT THREE  
 188.69 ACRES (BY DEED)  
 JOAN REID ANDERSON  
 AND HUSBAND, KEITH ANDERSON  
 TO  
 JEAN REID SEVERN  
 VOLUME 525, PAGE 612  
 NOVEMBER 1, 1979  
 D.R.W.C.T.

**LEGEND**

- △ CALCULATED POINT
- 5/8" IRON ROD WITH CAP STAMPED "GORRONDONA" SET
- ⊙ IRON PIPE FOUND (SIZE NOTED)
- IRON ROD FOUND (SIZE NOTED)

D.R.W.C.T. DEED RECORDS OF  
 WHARTON COUNTY, TEXAS  
 O.R.W.C.T. OFFICIAL RECORDS OF  
 WHARTON COUNTY, TEXAS

RE-SUBDIVISION OF LANDS  
 OF MISSOURI-LINCOLN  
 TRUST COMPANY  
 VOLUME 37, PAGE 640  
 D.R.W.C.T.

TRACT I  
 1059.68 ACRES (BY DEED)  
 HENDERSON FARMS, INC.  
 TO  
 CARAVELAS COMPANY, N.V.  
 VOLUME 491, PAGE 186  
 JANUARY 3, 1977  
 D.R.W.C.T.

LINE	BEARING	DISTANCE
L-1	S 39°26'31"W	358.32'
L-2	S 30°14'06"E	466.69'
L-3	S 59°45'54"W	466.69'
L-4	N 30°14'06"W	466.69'
L-5	N 59°45'54"E	466.69'
L-6	S 65°19'22"W	457.71'
L-7	S 59°45'54"W	466.69'
L-8	N 30°14'06"W	466.69'
L-9	N 59°45'54"E	466.69'
L-10	S 30°14'06"E	466.69'

188.90 ACRES (BY DEED)  
 JOHN W. WILLIAMS AND KIMBERLY J. WILLIAMS  
 TO  
 GREG A. KOENIG AND RONALD C. KOENIG  
 VOLUME 733, PAGE 743  
 FEBRUARY 19, 2008  
 O.R.W.C.T.

S 30°18'21"E 4151.32'

APPROXIMATE CL  
 OF JARVIS CREEK

LOT 4 TRACT 2  
 5.000 ACRES

FOUND  
 1/2" IRON PIPE  
 WITH CAP  
 STAMPED "KALKOMEY"

FOUND  
 5/8" IRON ROD WITH CAP  
 STAMPED "GORRONDONA"

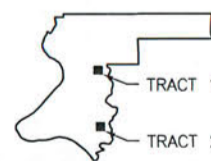
1868.89'  
 S 59°42'23"W 1944.02'

BLOCK 71  
 BLOCK 104

**P.O.B. TRACT 2  
 5.000 ACRES**

SET 5/8" IRON ROD WITH CAP  
 STAMPED "GORRONDONA"  
 TEXAS CENTRAL ZONE  
 NAD83/NSRS2007  
 STATE PLANE GRID COORDS.  
 GRID N: 9,691,601.02 US FT  
 GRID E: 3,663,395.65 US FT

562.205 ACRES (BY DEED)  
 MAXIM PRODUCTIONS CO., LP  
 TO  
 DCVK, LIMITED PARTNERSHIP  
 VOLUME 607, PAGE 247  
 MAY 9, 2005  
 O.R.W.C.T.



WHOLE PROPERTY MAP  
 & LOCATION OF TRACTS

Gorrondona & Associates, Inc.  
 4201 W. Parmer Lane, Bldg. B, Suite 100  
 Austin, Texas 78727  
 (512) 719-9933

NOTE: SEE PAGE 5 FOR EASEMENT NOTES.  
 HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
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 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.



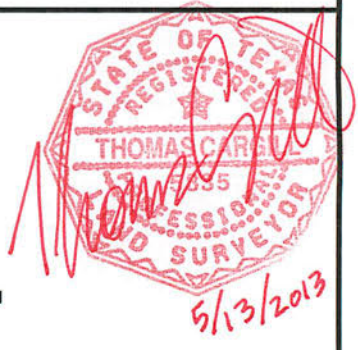
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 SCALE: 1"=600'  
 DATE: 5/13/2013  
 WO NO.: 72166  
 FIELD BOOK: LCRA2  
 DRAWN BY: R. Eckert

TWO TRACTS TOTALING 10.000 ACRES  
 OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 5  
 ABSTRACT No. 12  
 WHARTON COUNTY, TEXAS





WHARTON COUNTY, TEXAS  
 SYLVANUS CASTLEMAN SURVEY No. 5  
 ABSTRACT No. 12



ONLY THESE EASEMENTS LISTED IN LIMITED TITLE CERTIFICATE GF No. 2012-0904 DATED AUGUST 31, 2012, BY FIRST AMERICAN TITLE INSURANCE COMPANY WERE EVALUATED FOR THIS SURVEY. NO OTHER EASEMENT RECORD RESEARCH WAS PERFORMED BY GORRONDONA & ASSOCIATES INC.

- c) Easement as shown in instrument from John Norris to Texas Pipeline Company, dated November 4, 1945 and filed in Volume 183, Page 290, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- d) Easement as shown in instrument from John Norris to George K. Taggart, dated March 19, 1946 and filed in Volume 186, Page 57, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- e) Easement as shown in instrument from John Norris to Texas Pipeline Co., dated August 28, 1946 and filed in Volume 188, Page 75, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- f) Easement as shown in instrument from Johnnie Hobbs, et al to Texas Pipeline Company, dated June 30, 1951 and filed in Volume 242, Page 181, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- g) Easement as shown in instrument from J.R. Cox to Texas Central Power Co., dated January 28, 1926 and filed in Volume 73, Page 193, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- h) Easement as shown in instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 276, Page 56, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- i) Easement as shown in instrument from G.W. Townsend to Central Power & Light Co., filed in Volume 282, Page 450, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- j) Easement as shown in instrument from G.W. Townsend to Atlantic Refining Co., dated April 28, 1956 and filed in Volume 289, Page 486, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- k) Easement for electric transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated August 12, 1975 and filed in Volume 458, Page 382, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- l) Easement for electric transmission line as shown in instrument from Lois Ann Hecker to C.P. & L., dated June 16, 1955 and filed in Volume 282, Page 448, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- m) Pipeline easement as shown in instrument from J.B. Gary, Jr., et al to Texas Illinois Natural Gas Pipeline Company, dated August 8, 1950 and filed in Volume 230, Page 315, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- n) Pipeline easement as shown in instrument from J.B. Gary Estate to Humble Pipeline Company, dated December 13, 1951 and filed in Volume 245, Page 245, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- o) Pipeline easement as shown in instrument from J.B. Gary, Jr., Trustee to Humble Pipeline Co., dated February 13, 1967 and filed in Volume 381, Page 105, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- p) Pipeline easement as shown in instrument from Annie E. Taylor to Atlantic Oil Production Co., dated January 11, 1926 and filed in Volume 71, Page 388, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- q) Pipeline easement as shown in instrument from Annie E. Taylor to Atlantic Production Co., dated January 26, 1926 and filed in Volume 71, Page 490, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- r) Pipeline easement as shown in instrument from Annie E. Taylor to Sinclair Texas Pipeline Co., dated April 19, 1926 and filed in Volume 73, Page 462, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- s) Pipeline easement as shown in instrument from Annie E. Taylor to Humble Pipeline Co., dated March 21, 1926 and filed in Volume 74, Page 617, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- t) Easement for electrical transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated February 17, 1972 and filed in Volume 423, Page 409, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- u) Easement for electrical transmission line as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, Page 409, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- v) 10 ft. wide easement for electrical lines as shown in instrument from Henderson Farms, Inc. to Houston Lighting & Power Co., dated April 3, 1967 and filed in Volume 382, Page 408, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- w) Easement for electric transmission line as shown in instrument from Ada Houston Cox to C.P. & L., dated May 12, 1955 and filed in Volume 284, Page 278, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- x) Easement for pipeline as shown in instrument from Ada Houston Cox to Sohio Petroleum Co., dated June 30, 1954 and filed in Volume 270, Page 565, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- y) Easement for electric transmission line as shown in instrument from J.R. Cox to Houston Lighting & Power Co., dated March 29, 1926 and filed in Volume 74, Page 222, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- z) Easement for electric transmission line as shown in instrument from Ada H. Cox to H.L. & P., dated March 2, 1961 and filed in Volume 347, Page 207 Deed Records of Wharton County, Texas. (Does not affect subject tract)
- aa) Easement for electric transmission line as shown in instrument from T. Gordon, et al to Houston Lighting & Power Co., dated January 12, 1961 and filed in Volume 327, Page 556, Deed Records of Wharton County, Texas. (Does not affect subject tract)
- bb) 22 ft. wide easement for road along Northwest line of subject property as shown by Plat of said Subdivision, filed in Volume 37, Page 640, Deed Records of Wharton County, Texas. (Does not affect subject tract)

HORIZONTAL DATUM: NAD83/NSRS2007  
 VERTICAL DATUM: NAVD 88  
 COMBINED SCALE FACTOR: 1.00037640  
 BEARING BASIS: TEXAS LAMBERT GRID, CENTRAL ZONE, NAD83/NSRS2007  
 NOTE: ALL DISTANCES SHOWN ARE SURFACE VALUES  
 TO COMPUTE GRID DISTANCE MULTIPLY BY CSF OF 1.00037640.



Gorrondona & Associates, Inc  
 4201 W. Parmer Lane, Bldg. B, Suite 10  
 Austin, Texas 78727  
 (512) 719-9933

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TWO TRACTS TOTALING 10.000 ACRES  
 OUT OF  
 SYLVANUS CASTLEMAN SURVEY No. 5  
 ABSTRACT No. 12  
 WHARTON COUNTY, TEXAS



STATE OF TEXAS COUNTY OF WHARTON  
 I, hereby certify that this document was filed on the date  
 and time stamped and was recorded  
 on 07/01/2013 2:45 PM

*Mid-coast Title Co  
 111 N. Fulton  
 Wharton, TX 77488*

*Andra K. Sanders*

SCANNED  
 COUNTY CLERK, Wharton County, Texas  
 Deputy

## **Worksheet 5**

### **Attachment 2:**

**USACE Galveston - LCRA PCN (2015)**





April 6, 2015

Mr. Jayson Hudson  
U.S. Army Corps of Engineers  
Galveston District Office  
P.O. Box 1229  
Galveston, TX 77553-1229

Re: Revised Pre-Construction Notification for Nationwide Permit Verification  
LCRA Lane City Reservoir Project at Lane City, Wharton County, Texas  
Permit No. SWG-2013-00229

Dear Mr. Hudson:

The Lower Colorado River Authority (LCRA) received Nationwide Permit verification, Permit No. SWG-2013-00229, from the U.S. Army Corps of Engineers (Corps) for the Lower Basin Reservoir Project, now known as the Lane City Reservoir Project (Project) on May 22, 2014. Since that time, LCRA has considered some refinements to the Project which, if implemented, would require revisions to the original LCRA Pre-Construction Notification (PCN) package that LCRA submitted on January 29, 2014.

Enclosed is a revised Project PCN package that continues to demonstrate minimal impacts to waters of the U.S., allowing the revised Project to continue to be authorized by a series of Nationwide Permits (NWP). LCRA understands that the May 22, 2014, authorization is in effect and will continue to apply until revised by the Corps upon review and approval of the changes proposed herein.

Per your request, LCRA is resubmitting a complete PCN package that includes:

- A permit application form (ENG Form 4345);
- A written narrative describing the entire Project and specifically identifying design revisions to Project components that entail work within, or in close proximity to, waters of the U.S., including an updated table with revised fill quantities and the use of an additional NWP; and
- Updated figures depicting the revisions in the written summary and updated Attachments.

We greatly appreciate the effort that you have invested in the Project and look forward to working with you to facilitate the re-verification. Should you have any questions or require any additional information, please do not hesitate to contact Polly Johnson at 512-730-6750.

Sincerely,

A handwritten signature in blue ink that reads "Karen Bondy". The signature is written in a cursive, flowing style.

Karen Bondy, P.E.  
Senior Vice President, Water Resources

Enclosure

# Revised Pre-Construction Notification

---

## Lane City Reservoir Project Wharton County, Texas USACE Permit No. SWG-2013-00229



Prepared By:

Lower Colorado River Authority  
P.O. Box 220  
Austin, Texas 78767

Date:

April 6, 2015



*Mary P. Mayfield*  
4-6-15

This document is released for permitting purposes only, under the authority of Mary P. Mayfield, P.E. No. 107538 on April 6, 2015. This document is not intended for bidding, construction, or other purposes.



**U.S. ARMY CORPS OF ENGINEERS  
APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT**  
33 CFR 325. The proponent agency is CECW-CO-R.

*Form Approved -  
OMB No. 0710-0003  
Expires: 30-SEPTEMBER-2015*

Public reporting for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

**PRIVACY ACT STATEMENT**

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

**(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)**

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE
--------------------	----------------------	------------------	------------------------------

**(ITEMS BELOW TO BE FILLED BY APPLICANT)**

5. APPLICANT'S NAME First - Karen                      Middle -                      Last - Bondy Company - Sr. Vice President, Lower Colorado River Authority E-mail Address - [REDACTED]	8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required) First -                      Middle -                      Last - Company - E-mail Address -
---	--

6. APPLICANT'S ADDRESS: Address- P.O. Box 220, Mail Code L200 City - Austin                      State - TX                      Zip - 78767                      Country - USA	9. AGENT'S ADDRESS: Address- City -                      State -                      Zip -                      Country -
---	--

7. APPLICANT'S PHONE NOs. w/AREA CODE a. Residence                      b. Business                      c. Fax N/A                      512-578-4019                      512-473-4026	10. AGENTS PHONE NOs. w/AREA CODE a. Residence                      b. Business                      c. Fax
---	--

**STATEMENT OF AUTHORIZATION**

11. I hereby authorize, \_\_\_\_\_ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

\_\_\_\_\_  
SIGNATURE OF APPLICANT                      DATE

**NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY**

12. PROJECT NAME OR TITLE (see instructions)  
Lane City Reservoir Project (formerly Lower Basin Reservoir Project at Lane City)

13. NAME OF WATERBODY, IF KNOWN (if applicable) Colorado River, Jarvis Creek, Unnamed Tributary to Jarvis Creek	14. PROJECT STREET ADDRESS (if applicable) Address 317 County Road 120
--	---

15. LOCATION OF PROJECT Latitude: +N 29.19633137                      Longitude: +W -96.04253840	City - Wharton                      State- TX                      Zip- 77488
---	---

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)  
State Tax Parcel ID                      Municipality  
Section -                      Township -                      Range -

17. DIRECTIONS TO THE SITE

The project area is located at the southwest corner of the intersection of County Road 120 and State Highway 60 in Lane City, Wharton, County, Texas. See Attachment 1, Figures PCN-001 and PCN-002 in the enclosed Pre-Construction Notification (PCN) package.

18. Nature of Activity (Description of project, include all features)

LCRA's Lane City Reservoir Project includes the construction of an earthen, ring-dike off-channel reservoir and related storm water drainage features; repairs and upgrades to LCRA's existing pump stations, including the water intake structures in the Colorado River; improvements to and re-routing of LCRA's existing canal within the project area; construction of a re-lift pump station to transfer water between the reservoir and the canal; replacement of an existing bridge and canal flume over Jarvis Creek; and construction of an outfall to transfer water from the reservoir and canal back to the Colorado River. A more detailed description of the project is provided in Section 4 of the enclosed PCN package. Figures depicting the planned construction activities are provided in Attachment 1 of the PCN package.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

The purposes of the Lane City Reservoir Project are to construct and operate a reservoir that will: 1) Provide up to 90,000 acre-feet per year of new firm water supply; 2) Reduce demands on LCRA's Highland Lakes; 3) Improve agricultural water reliability; 4) Improve agricultural water efficiency; and 5) Reduce the risk of firm water curtailment. See Section 2 of the enclosed PCN package for additional information. Project mobilization and preliminary work in uplands areas commenced in February 2015 in accordance with the May 22, 2014 NWP verification letter from the USACE Galveston District. Work within waters of the U.S. is expected to commence in May 2015. The project is expected to be complete in mid- to late-2017.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

See Sections 4 and 5.1 and Attachment 3 of the enclosed PCN package.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type	Type	Type
Amount in Cubic Yards	Amount in Cubic Yards	Amount in Cubic Yards

See Attachment 3 of the enclosed PCN pkg.

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres 0.26 Acre (see Section 5.1 and Attachment 3 of the enclosed PCN package)

or

Linear Feet

23. Description of Avoidance, Minimization, and Compensation (see instructions)

See Sections 3 and 4 of the enclosed PCN package.

24. Is Any Portion of the Work Already Complete?  Yes  No IF YES, DESCRIBE THE COMPLETED WORK

Construction of a test embankment, a construction office and maintenance yard, and associated bestow areas have been initiated in splash-basin within the project boundary. No work entailing dredge or fill within a water of the U.S. has been initiated. The work has proceeded in accordance with the USACE Galveston District's NWP Verification Letter dated May 22, 2014 (Permit No. SWG-2013-00229)

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody of this Project to whom this permit shall be applicable to:

a. Address: Not Applicable for NWP Pre-Construction Notice

City: State: Zip:

b. Address:

City: State: Zip:

c. Address:

City: State: Zip:

d. Address:

City: State: Zip:

e. Address:

City: State: Zip:

26. List of Other Certificates or Approvals/Consents received from other Federal, State, or Local Agencies for Work Described in This Application

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
See Sections 6, 7 & 8.					

\* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.


4/6/15


SIGNATURE OF APPLICANT      DATE      SIGNATURE OF AGENT      DATE

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 21 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or device; or disposes a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both.

# Executive Summary

---

The Lower Colorado River Authority (LCRA) plans to construct an off-channel reservoir system near Lane City in Wharton County, Texas. The Lane City Reservoir Project (formerly referred to as the Lower Basin Reservoir Project at Lane City) includes the following primary components:

- Construction of an earthen ring-dike, off-channel reservoir and related storm water drainage conveyances;
- Repair of and upgrades to LCRA's existing pump stations including the water intake structures in the Colorado River;
- Improvements to and re-routing of LCRA's existing canal;
- Construction of a re-lift pump station to transfer water between the reservoir and the canal;
- Replacement of an existing bridge and canal flume over Jarvis Creek; and
- Construction of an outfall to transfer water from the reservoir and canal back to the Colorado River.

This revised Pre-Construction Notification (PCN) package documents the project design in sufficient detail to demonstrate that the project will have minimal impacts to waters of the U.S. subject to Section 404 of the Clean Water Act and that construction of the project may be authorized by the U.S. Army Corps of Engineers (USACE) Galveston District via a series of Nationwide Permits (NWPs). The project also involves the placement of both temporary and permanent fill and structures in the Colorado River, which is a navigable water subject to Section 10 of the Rivers and Harbors Act of 1899.

LCRA submitted its original PCN package for this Project to the USACE Galveston District on January 29, 2014, and USACE Galveston District issued an NWP verification on May 22, 2014, USACE Permit No. SWG-2013-00229. This PCN package includes revisions to the January 29, 2014 package and LCRA requests USACE Galveston District's re-verification.

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## **Attachments**

- Attachment 1: Figures
  - A. April 6, 2015 Revised Figures
  - B. January 29, 2014 Figures Annotated with Revisions
- Attachment 2: USACE Preliminary Jurisdictional Determination
- Attachment 3: Summary of Potential Impacts to Waters of the U.S.
- Attachment 4: Jarvis Creek Stream Condition Assessment
- Attachment 5: Project Implications for Channel Morphology
  - A. April 24, 2014 Assessment
  - B. April 6, 2015 Update
- Attachment 6: Endangered and Threatened Species Summary
- Attachment 7: Water Quality Certification Form
- Attachment 8: Draft Cultural Resources Survey of LCRA's Proposed Fiber Optic Line Construction



# 1. Introduction

The Lower Colorado River Authority (LCRA) is a conservation and reclamation district created by the Texas Legislature in 1934. LCRA manages water supplies and floods in a 600-mile stretch of the lower Colorado River basin between San Saba, Texas, and the Gulf Coast. LCRA operates six dams on the Colorado River that form the Highland Lakes: Buchanan, Inks, LBJ, Marble Falls, Travis and Lake Austin. LCRA regulates water discharges from the Highland Lakes to manage floods and releases water from Lakes Buchanan and Travis to meet downstream municipal, agricultural, industrial, and environmental needs. Some of LCRA's downstream customers withdraw water directly from the Colorado River. Other LCRA customers rely on LCRA's Irrigation Divisions to withdraw water from the river and deliver it to them via LCRA's pumping plants and canal systems located in Colorado, Wharton, and Matagorda Counties.

LCRA plans to construct and operate the Lane City Reservoir Project (LCRP), formerly referred to as the Lower Basin Reservoir Project, to enable LCRA to manage its water supply more efficiently and to enhance its ability to fulfill customer demands throughout the lower Colorado River basin.

## 2. Project Purpose and Need

On February 22, 2012, the LCRA Board of Directors adopted a resolution of "implementing specific water supply projects over the next five years that will add at least 100,000 acre-feet of new firm water supply, which will further enable more efficient use and management of LCRA's overall water supply, including stored water in lakes Buchanan and Travis." Achieving this goal will help ensure customers throughout the basin continue to have a reliable source of water in the future, even during severe droughts.

Previous water supply planning studies including the Region K Water Supply Plans (TWDB 2006, 2010a, 2012) and LCRA's internal water resource supply planning efforts evaluated a number of water supply options and demonstrated that off-channel reservoirs (OCRs) in the lower Colorado River basin are an effective option for developing additional firm water supplies. Storage reservoirs in the lower basin are considered practical because historically there has been sufficient water in the river for diversion and there are existing raw water customers to use the stored water.

The Lane City Reservoir Project (LCRP) described herein is designed to achieve the following objectives:

- Provide approximately 90,000 acre-feet per year of firm water supply;
- Be in operation within 5 years after the 2012 LCRA Board resolution (in 2017);
- Reduce demands on the Highland Lakes;
- Improve agricultural water reliability;
- Improve agricultural water efficiency; and,
- Reduce risk of firm water curtailment.

The LCRP meets the project objective of providing approximately 90,000 acre-feet per year of firm water supply and contributes to the broader LCRA Board goal of adding 100,000 acre-feet per year of new firm water supply by 2017. LCRA will continue to pursue other options for the development of additional water supplies for the region and for conservation of the existing water supplies; however, the LCRP is a standalone project that is independent of other water supply projects that LCRA has implemented, is currently evaluating, or may consider in the future.

Construction and operation of the LCRP is not dependent upon the construction or operation of any other system or project, nor are any other projects dependent upon the LCRP.

### 3. Site Selection

LCRA's site selection process entailed the identification and evaluation of alternate sites to select the property or properties most suitable for the reservoir project. Once a site was selected, the placement of the project within the property boundaries was optimized to avoid or minimize impacts to waters of the U.S. and archaeological and cultural resources identified at the site.

#### 3.1 Property Location

In response to the LCRA Board's February 2012 resolution, LCRA staff initiated a study to identify potential sites for the construction of one or more OCRs in the lower Colorado River basin that would meet the LCRA Board's objectives cost effectively and with minimum impacts to the environment. LCRA staff used the following criteria for site selection:

- Located within an LCRA Irrigation Division;
- Located in proximity to existing LCRA pump stations;
- Located in proximity to existing LCRA water customers;
- Located adjacent to or very near existing LCRA irrigation canals;
- Having limited interaction with the Colorado River 100-year floodplain;
- Containing soils suitable for embankment construction;
- Avoiding or minimizing construction in waters of the U.S.;
- Avoiding cultural resources as much as possible;
- Avoiding or minimizing relocation of existing utilities or structures; and,
- Allowing construction of a rectangular reservoir.

In all cases there was a desire to utilize, to the extent possible, existing infrastructure and to operate within the water diversion rates allowed under existing water right permits. Functionally, each reservoir alternative needed to include the ability to divert water from the Colorado River for storage in the OCR and the ability to return the stored water back to irrigation canals and the river.

LCRA identified and evaluated three potential sites within its Irrigation Divisions for the development of one or more reservoirs. A fourth site, the Baylor Creek site, was evaluated for development in conjunction with one or more of the Irrigation Division sites. The four sites evaluated are listed below.

- **Prairie Site** -- The Prairie site is in the Lakeside Irrigation Division about 2.5 miles north of Eagle Lake, Texas in Colorado County. It encompasses about 1,745 acres in area. Current land usage includes agriculture and ranchland.
- **Lane City Site** -- The Lane City site is in the Gulf Coast Irrigation Division east of the river near Lane City, Texas in Wharton County. It encompasses approximately 2,400 acres of land located between the Colorado River and Lane City. Current land usage includes agriculture and ranchland.
- **Markham Site** -- The Markham site is in the Gulf Coast Irrigation Division west of the river near the city of Markham, Texas in Matagorda County. It encompasses about 1,100 acres. Current land usage includes agriculture and ranchland.

- **Baylor Creek Site** -- The Baylor Creek site is located in Fayette County at the Fayette Power Project (FPP), which LCRA currently owns along with the City of Austin. The site has been identified as a potential site for a storage reservoir since the plant was developed.

At each potential site within the Irrigation Divisions, the following activities were completed:

- Existing infrastructure assessment (pumping plants, canals, etc.);
- Geotechnical investigation;
- Environmental site assessment;
- Natural resource assessment, including identification of potential waters of the U.S. and evaluation of the potential occurrence of federally and state-listed endangered and threatened species and other rare species in the project area; and
- Preliminary assessment of cultural resources.

Conceptual project designs and operating parameters were developed and evaluated that included single reservoirs at each of the three Irrigation Division sites and for multi-site configurations that included combinations of reservoirs at two or more of the four sites. In all cases, the reservoir site alternatives were conceived and evaluated as standalone projects that could be permitted and constructed independent of each other but collectively would be able to contribute to fulfilling the LCRA Board of Directors' objectives for the development of new firm water supplies. Any combination of the alternatives that were considered could have proceeded in parallel or in series, with or without overlapping schedules, or not at all.

Upon completion of the site alternatives evaluation, LCRA found that the construction of a single approximately 40,000 acre-foot OCR at the Lane City site was the most practicable and cost-effective alternative that would fulfill the project goal of providing approximately 90,000 acre-feet per year of firm water supply and that met all of the criteria stated herein, including the avoidance and minimization of impacts to waters of the U.S. and other environmental resources. Therefore, LCRA selected the Lane City site for development of the LCRP. The project location is depicted in Attachment 1.A., PCN-001.

## 3.2 Property Description

The LCRA property boundary at the Lane City site is depicted in Attachment 1.A., PCN-002. The property is bordered on the southwest by the Colorado River and on the northwest by LCRA's Pump Station Road (also referred to as County Road 120). LCRA's pump stations are located at the west corner of the site. The pump stations pump water from the Colorado River up to the west end of the Lane City Canal. The canal is constructed at natural grade and is contained within above-grade earthen levees. The canal extends from the pumping stations towards the northeast, turns through the property, and forms most of the northeast boundary of the site. Jarvis Creek generally flows from northwest to southeast through the site before discharging to the Colorado River at the southern end of the property. A concrete flume supported by an elevated trestle transfers water in the canal over Jarvis Creek. McGowan Road (also referred to as County Road 116) extends from northeast to southwest through the site. Low water crossings provide vehicular access across Jarvis Creek at Pump Station Road and McGowan Road. A steel bridge also spans Jarvis Creek at McGowan Road.

The property is predominantly comprised of nearly flat, pastures and agricultural fields used for the production of cotton, sorghum, corn and turf grass. Historically, some of the fields have been used to produce rice. Oil and gas wells and an associated injection well were recently plugged and abandoned near the southern edge of the property, west of Jarvis Creek.

### 3.3 Project Area Designation and Avoidance Efforts

In the January 29, 2014 PCN package, LCRA designated a Project Area Boundary within the Lane City property (see Attachment 1.B, Figure PCN-003). Riparian areas along the Colorado River are excluded from the Project Area except in those locations where the existing infrastructure within the river will be repaired or replaced and a new outfall to the river will be constructed. Additionally, in consultation with USACE Galveston District personnel, LCRA excluded from the Project Area an approximately 200-foot wide buffer zone along both banks of Jarvis Creek except in those locations where existing infrastructure will be removed and replaced. LCRA has expanded the Project Area Boundary to include an area northwest of the existing pumping plant to facilitate the installation of a new belowground fiber optic cable between the pumping plant and LCRA's existing telecommunications tower. The revised Project Area Boundary for the LCRP is depicted in Attachment 1.A., PCN-003.

In April 2013, SWCA Environmental Consultants (SWCA) conducted a routine wetlands determination of the Project Area in accordance with applicable USACE manuals and guidance and mapped the ordinary high water mark (OHWM) in locations where LCRA anticipated that the project might impact waters subject to USACE jurisdiction under Section 404 of the Clean Water Act (Section 404). The data collected during the April 2013 assessment and a jurisdictional determination request were submitted to the USACE Galveston District on May 30, 2013. In consultation with USACE, LCRA and SWCA prepared and submitted additional data to USACE in addenda to the May 30, 2013 jurisdictional determination request dated July 31, 2013, September 3, 2013, and September 23, 2013. A copy of the Preliminary Jurisdictional Determination (PJD) for the LCRP Project Area issued by USACE on October 8, 2013, is provided in Attachment 2. In the PJD letter, the following four aquatic resources within the Project Area Boundary are identified as waters of the U.S. subject to Section 404:

- 3.81 acres of the Colorado River;
- 0.81 acre of Jarvis Creek;
- 0.33 acre of an unnamed tributary to Jarvis Creek; and
- A 0.2-acre wetland.

No other aquatic resources subject to Section 404 were identified by USACE within the Project Area Boundary. The locations of these four resources are depicted in Attachment 1.A., PCN-003. The area northwest of the existing pumping plant that is captured within the expanded Project Area Boundary is solely in uplands; no waters of the U.S. are present.

Although the unnamed tributary to Jarvis Creek and the wetland nearby are within the Project Area Boundary, the LCRP has been designed to minimize impacts to the unnamed tributary to the extent practicable and to avoid the wetland entirely. The project has also been designed to avoid a potentially significant archaeological site and a probable historic cemetery identified at the site during archaeological survey activities. These two sites are designated as "Permanent Avoidance Areas" in Attachment 1.A., PCN-003.

## 4. Project Description

The LCRP entails the construction of an approximately 40,000 acre-foot off-channel reservoir (OCR) system for the storage of water pumped from the Colorado River using LCRA's existing pump stations. Water will be conveyed from the existing river pump stations to the OCR through the existing Lane City Canal, and transferred to the OCR via a new re-lift pump station. When needed, water may be released from the reservoir to the canal and either returned to the river or

distributed to LCRA customers via the existing canal system. A new pipeline and outfall structure will be constructed to transfer stored water from the canal back to the river.

In addition to construction of the OCR, the LCRP includes the following primary components:

- Pump station maintenance;
- Pipeline and river outfall construction;
- Canal improvements and re-routing;
- Canal flume removal and replacement;
- Pump Station Road (CR 120) bridge replacement, temporary crossing construction, and removal of the existing low water crossing;
- McGowan Road (CR 116) temporary crossing construction and removal of the existing low water crossing;
- The re-routing of existing and construction of new storm water drainage conveyances including storm water ditch outfalls to Jarvis Creek and the unnamed tributary to Jarvis Creek; and
- Re-lift pump station construction.

A general plan of the LCRP configuration is provide in Attachment 1.A., PCN-004. A description of each component and anticipated construction impacts are presented below. Revised figures depicting the planned project improvements are provided in Attachment 1.A. Additionally, the figures submitted to the USACE Galveston District in the January 29, 2014 PCN package have been annotated to describe changes in the project design since the 2014 package was submitted. The annotated figures are provided in Attachment 1.B.

## 4.1 Pump Station Maintenance

The LCRA currently owns and operates two river pump stations within the Project Area Boundary that supply river water to LCRA irrigation operations:

- Horizontal pump station (HPS) and
- Vertical pump station (VPS).

Engineering studies have shown that, with some maintenance work, these existing facilities can be used as components of the new LCRP. These existing pump stations will be used to lift water from the Colorado River to the adjacent Lane City Canal. The intake structures associated with each station have corroded components that are in need of repair or replacement. The repair of the damaged components is needed not only to meet the functional requirements of the LCRP, but also to ensure the reliability of LCRA's existing irrigation operations. A site plan depicting the pump stations is provided in Attachment 1.A., PCN-005.

### 4.1.1 HPS Maintenance and Upgrades

Attachment 1.A., Figures PCN-006 and PCN-007 provide plan and section views depicting the planned configuration of the HPS suction piping. The footprint of the proposed expansion to the HPS building is also depicted in PCN-006. Maintenance activities planned for the HPS include the following:

- Replacing the aboveground portions of the three existing intake suction pipes which are corroded and installing liners within the belowground portions of the pipes;
- Replacing the cross beams on the existing timber H-pile supports within the Colorado River to support the three pipes;
- Upgrading and replacing selected mechanical and electrical components adjacent to and inside the HPS building; and

- Expanding the HPS building (referred to as Pumphouse 1 in historical structure survey reports and correspondence) to accommodate the equipment improvements.

A temporary sheet pile coffer dam may be installed around the existing intake suction pipes within the river to facilitate their replacement and a temporary access ramp may be graded along the river bank to provide access for construction equipment and materials. The access ramp will be above the OHWM mapped at the HPS intakes (see Attachment 1.A., Figure PCN-005). Upon completion of the maintenance activities, the temporary coffer dam will be removed and the areas within the access ramp grading limits will be graded to match existing conditions, seeded, and stabilized using erosion control matting unless otherwise specified in the figures provided in Attachment 1.A. Temporary shoring will be provided as needed in areas within the access ramp to protect the remaining portions of the foundation of a pump plant that was constructed in 1901 and later demolished.

LCRA initially planned to excavate the river bank adjacent to the HPS and to replace the entire length of each intake suction pipe, along with the piles in the river that currently support the pipes (see Attachment 1.B., Figures PCN-006 and -007). By leaving the belowground portions of the intake suction pipes intact and lining them, LCRA will significantly reduce the area of the river bank that is disturbed during construction activities.

#### **4.1.2 VPS Maintenance and Upgrades**

Maintenance activities at the VPS will include replacing the existing corroded structural elements and improvements to or replacement of selected mechanical and electrical components. Plan and section drawings depicting the existing VPS structure and proposed repairs are provided in Attachment 1.A., Figures PCN-009, -010 and -011. A temporary sheet pile coffer dam may be installed around the existing silt dam and wet well structure to facilitate dewatering. All other work will be conducted within the existing structure or in areas above the OHWM. If temporary grading along the river bank is needed to provide access for construction equipment and materials, all grading will be completed above the OHWM in the vicinity of the VPS. Upon completion of construction, the temporary sheet pile coffer dam will be removed and all areas within the access ramp grading limits will be graded to match existing conditions, seeded, and stabilized using erosion control fabric, unless otherwise specified in the figures provided in Attachment 1.A.

### **4.2 Pipeline, River Outfall, and Bank Stabilization**

A pipeline extending from a new concrete intake structure at the headworks of the Lane City Canal to a new outfall structure in the river channel will be constructed to facilitate the return of stored water from the canal and OCR to the river. The pipeline, outfall, and surrounding bank stabilization features are designed to discharge flows ranging from 50 cfs to 450 cfs routinely. In the event of an emergency (e.g., a significant hurricane is imminent and the OCR is full), the system is designed to convey an emergency discharge rate of up to 750 cfs.

#### **4.2.1 Initial (January 2014) Outfall Design**

The river outfall structure was initially designed as a 15-foot diameter concrete stilling well structure in the river bed with an 84-inch diameter pipe extending belowground from the Lane City Canal headworks to the stilling well in the river bed (see Attachment 1.B., Figures PCN-012, -013 and -014). Water discharged from the outfall pipe would jet horizontally into the bottom of the stilling well and then flow up and out of the stilling well onto a surrounding tremie concrete slab. The initial design also included grouted rip rap along the toe of the river bank and the use of natural bank stabilization measures similar to those identified herein (fabric-encapsulated soil



lifts, brush layers, etc.). Construction of the initially planned pipeline and outfall structure would have entailed excavation of an approximately 15 feet deep trench below the river bed for installation of the outfall pipeline and stilling well.

There were concerns about the potential for settled solids and bedload to become inundated in the stilling well and blocking the incoming pipe that is located on the bottom of the stilling well. With the risk of compromising the functionality, as well as the construction costs anticipated for the initial design, LCRA reassessed the outfall design and has provided a new outfall design in this PCN package.

#### **4.2.2 Revised (April 2015) Outfall Design and Lower Bank Stabilization**

The intake structure at the canal will discharge to a 108-inch diameter, belowground welded steel pipe which will transition to 84 inches in diameter, and then further reduce to 60 inches in diameter near the river. The 60-inch pipe will emerge horizontally from the river bank and downturn 90 degrees prior to discharging into the outfall stilling well (OSW) at the edge of the river bed. The OSW will serve as an energy dissipation structure and will be a braced sheet pile structure consisting of an approximately 23 feet by 23 feet box formed from steel sheet piles driven into the river bed. The top elevations of the steel sheet piles for the OSW will assist in providing a distribution of flows to better protect the far bank of the river. Riverbed materials within the OSW will be excavated from existing grade down to elevation 20 feet. A 4-foot thick tremie concrete slab will be poured on the native riverbed materials within the OSW. Plan and profile views of the proposed intake structure to the outfall pipeline, the pipeline and the OSW structure are provided in Attachment 1.A., Figures PCN-005, -012, and -013. Plan and section details depicting the OSW construction are provided in Attachment 1.A., Figure PCN-014.

To protect the OSW infrastructure, river bed, and river banks from erosive forces, several permanent treatments will be used to stabilize the river bank and area around the outfall. The OSW will be surrounded by a tremie concrete slab (approximately 105 feet x 40 feet) in the channel bounded by a permanent sheet pile perimeter cut flush with the top of the tremie concrete slab on the upstream, downstream and channel sides of the slab. An 8-foot wide articulating concrete block mat (ACM) will be placed on existing grade around the tremie concrete slab. The elevation of the tremie concrete slab and the ACM will be set below natural grade of the river bed to protect from scour while also having a low potential of changing the course of the river by projecting above the river bed. A steel sheet pile wall will be installed along the river bank and will provide the boundary for the bank side of the tremie concrete slab. At key locations, the alignment of the shore sheet pile will deflect flow away from the river bank and into the center of the river. The void space between the sheet pile wall and the bank will be backfilled with earthen or granular fill or rip rap. The top of the sheet pile wall will be at elevation 55 feet adjacent to the OSW. The top of the sheet pile wall and the fill behind it will step down as it extends upstream and downstream away from the OSW. The configuration of the sheet pile wall, tremie slab and ACM is depicted in Attachment 1.A., Figures PCN-012, PCN-013, and PCN-014.

To assess and optimize the new outfall design, a physical model study was performed at the Utah Water Research Laboratory at Utah State University in Logan, Utah. As indicated in the final report for the model study (Barfuss, et al., 2014), the first objective of the study was to evaluate the energy dissipation effectiveness of the proposed outfall pipe and stilling well design and to make design changes as needed to improve upon the overall effectiveness of the design. The second objective of the study was to evaluate potential problems with sedimentation in the OSW and determine the effectiveness of the hydraulic design to remove sediment that may be captured within the OSW during periods of no discharge from the OCR.

The physical model was constructed at a relatively large scale of 1:5.172, and was operated with flow rates ranging from 125 cfs to 600 cfs and with varying tailwater depths. The infrequent

emergency reservoir drawdown flow rate was 590 cfs at the time of the physical model testing. Wave heights, water surface fluctuations, and velocities were monitored over the OSW and the tremie concrete slab for multiple outfall flows at different river water elevations. The results of the physical model study and related computational fluid dynamics (CFD) modeling were relied upon to determine the following:

- The pipe outlet elevation and the need for and configuration of a diffuser cone on the pipe outlet;
- The general horizontal dimensions of the OSW, the OSW floor elevation, the placement of structural beams within the OSW, and the top elevation of each side of the OSW;
- The general alignment of the river bank sheet piles;
- The horizontal extent, grade and slope of the tremie concrete slab; and
- The ability of the water discharged from the outfall to flush out sediment that may accumulate within the OSW.

During the final configuration tests, velocities measured at numerous locations on the tremie concrete slab and at varying discharge flow rates and conservatively low river water levels did not exceed 4.0 fps, and wave heights over the tremie concrete slab were 0.6 feet or less. It was determined that energy will dissipate quickly after water is discharged from the OSW and that potential erosion to the bed and banks of the river from the river outfall discharges will be minimized.

Following the physical modeling effort, the flow rate requirement for the infrequent emergency reservoir drawdown event increased from 590 cfs to 750 cfs. The physical model was no longer available to evaluate the increased flow rate. A CFD modeling evaluation was performed to compare the changes in wave heights due to the increased flow. The analysis was a relative comparison of 590, 700, and 800 cfs. The results of the comparison showed no measurable increase in wave height or velocity on the tremie concrete slab. In addition, an option to further mitigate the potential for erosion would be to raise the downstream gate at the Lane City Dam for the infrequent emergency reservoir drawdown event. All the testing was done at conservatively low water levels assuming no additional flows in the river. Any increase in the tailwater elevation will significantly reduce water velocity and wave heights further.

### **4.2.3 Upper Bank Stabilization**

Upon completion of construction of the outfall, OSW, and sheet pile wall, the disturbed areas of the river bank above the sheet pile wall and related backfill (e.g., over the outfall pipe and where temporary access ramps are constructed) will be stabilized using fabric-encapsulated soil lifts (FESLs), live fascines, and brush layers between approximate elevations of 51.0 feet and 68.0 feet. Disturbed slopes between approximate elevations of 68.0 feet and 80.0 feet will be graded to match existing conditions and stabilized with live brush layers and a geotextile erosion control blanket. Above elevation 80.0 feet, disturbed slopes will be graded to match existing conditions, seeded, covered with a geotextile erosion control blanket, and planted with native shrubs. Native plant species will be selected for all seed, shrubs, and live cuttings used for brush layers, live fascines, and live stakes. The approximate configuration of the FESL and upper slope stabilization measures is depicted in Attachment 1.A., Figures PCN-012, -015, and -016.

## **4.3 Canal Improvements and Re-Routing**

As is noted in the PJD, the Lane City Canal is not a water of the U.S. subject to Section 404 of the Clean Water Act; however, it has been assessed as eligible for inclusion in the National Register of Historic Places (see Section 6).

A portion of the existing Lane City Canal in the vicinity of the canal flume over Jarvis Creek and the new re-lift station adjacent to the OCR will be re-aligned slightly and lined with concrete to improve channel hydraulics. Additionally, approximately 4,500 linear feet of the canal near the northeast corner of the Project Area Boundary will be realigned to accommodate construction of the OCR. The location of the relocated canal reach is depicted in Attachment 1.A., Figure PCN-004. Other improvements include, but are not limited to, the construction of an outfall structure at the canal headworks as discussed in Section 4.2; the construction of an intake and outfall structure at the re-lift station; and the installation of headlocks to manage water flow in the canal.

## **4.4 Canal Flume Removal and Replacement**

The existing canal flume and elevated trestle crossing over Jarvis Creek will be replaced with a new, more water tight structure with a wider cross-section to match the cross-section of the abutting, improved canal segments. The flume and abutments will be demolished, and the existing concrete piers will be demolished to existing grade. Belowground portions of the existing piers will be abandoned in place unless they can be removed with minimal disturbance of the creek channel.

The new flume (approximately 28 feet wide x 160 feet long) will be elevated above Jarvis Creek. Three wall piers will be required to support the flume, but only the middle pier (31 feet wide x 2 feet thick) will be located within the area bounded by the OHWM. Steel pipe piles and concrete pile caps will support the concrete wall piers and the new flume. Temporary excavation within Jarvis Creek will be required to drive the pipe piles and construct the concrete pile caps. Temporary bank grading within Jarvis Creek may also be necessary to provide vehicle and equipment access; however, no grading for temporary access will be conducted within the area bounded by the OHWM. Upon completion of the construction activities, all temporary excavations will be backfilled and the temporary access ramp will be re-graded to match existing conditions. and revegetated.

Plan and section views of the canal flume are provided in Attachment 1.A., Figures PCN-017 and PCN-019, respectively.

## **4.5 Pump Station Road Bridge Replacement and Temporary Crossing**

The existing low water crossing (culvert and concrete structure) over Jarvis Creek at Pump Station Road will be replaced with a new 26-foot wide bridge supported by two new abutments and two new wall piers. The new bridge (approximately 26 feet wide x 130 feet long) will be elevated above Jarvis Creek and will be constructed adjacent to the existing low water crossing in the location of an existing, non-functional timber bridge. The aboveground components of the timber bridge will be demolished, and the belowground portions of the timber piers will be abandoned in place unless they can be removed with minimal disturbance of the creek bed. The existing bridge abutments also will be demolished and the abutment slopes, which are above and beyond the OHWM, will be graded to accommodate the new bridge structure.

The new bridge will be supported by two concrete wall piers (each approximately 28.6 feet wide x 2.5 feet thick). One of the new wall piers will be located partially within the extents of the OHWM in Jarvis Creek. Steel pipe piles and concrete pile caps will support the concrete wall piers and new bridge. Temporary excavation within Jarvis Creek will be required to drive the pipe piles and construct the concrete pile caps. Temporary bank grading within Jarvis Creek may also be necessary to provide vehicle and equipment access. Upon completion of the construction activities, all temporary excavations will be backfilled and the temporary access ramp will be re-

graded to match existing conditions and revegetated. Plan and section views of the new bridge over Jarvis Creek at Pump Station Road are provided in Attachment 1.A., Figures PCN-017 and -018.

Prior to its demolition, temporary improvements may be made to the existing low water crossing to facilitate the transport across Jarvis Creek of equipment and materials needed for the HPS and VPS repairs and for construction of the river outfall and replacement bridge and canal flume (see Attachment 1.A., Figure PCN-020). Following completion of construction activities, the existing culvert and concrete crossing structure and all temporary improvements will be removed; a new restored stream channel will be excavated to a more natural gradient; and a rock or concrete rip rap grade control structure (approximately 24 feet wide x 8 feet long) will be placed below finished grade (5 feet minimum depth) to reduce the potential for headcut through the new channel and upstream structures. The restored channel will have a bottom width of 14 feet and 2H:1V side slopes. FESLs will be constructed on each bank (each lift approximately one foot thick), rising a total of approximately five feet above the bottom of the channel. Slopes above the upper FESL limit will be stabilized with erosion control fabric and vegetated. FESL lifts will be backfilled with native material. The restoration plan and cross-sections for the Pump Station Road crossing at Jarvis Creek are provided in Attachment 1.A., Figures PCN-021 and -025. Typical creek restoration cross-sections that generally depict the configuration of the FESLs and rock grade control structure are provided in Attachment 1.A., Figure PCN-024.

## **4.6 McGowan Road Temporary Crossing**

A temporary, 40-foot wide haul road may be constructed over the existing low-water crossing across Jarvis Creek at McGowan Road to enable the transport of fill material from the borrow area west of the creek to the OCR construction site. The temporary haul road plan and section are depicted in Attachment 1.A., Figure PCN-022. Following completion of construction activities, the existing culvert and concrete crossing structure and all temporary improvements will be removed; a new restored stream channel will be excavated to a more natural gradient; and a rock or concrete rip rap grade control structure (approximately 24 feet wide x 8 feet long) will be placed below finished grade (5 feet minimum depth) to reduce the potential for headcut through the new channel. The restored channel (approximately 120 linear feet) will have a bottom width of 14 feet and 2H:1V side slopes. FESLs will be constructed on each bank (each lift approximately one foot thick), rising approximately five feet above the bottom of the channel. Slopes above the upper FESL limit will be stabilized with erosion control fabric and vegetated. FESL lifts will be backfilled with native material. The restoration plan and cross-sections for the McGowan Road crossing at Jarvis Creek are provided in Attachment 1.A., Figures PCN-023 and -025. Typical creek restoration cross-sections that generally depict the configuration of the FESLs and rock grade control structure are provided in Attachment 1.A., Figure PCN-024.

## **4.7 Off-Channel Reservoir and Storm Water Drainage Conveyances**

The approximately 40,000 acre-foot OCR will be constructed with an earthen, ring-dike configuration. The earthen embankment enclosing the OCR will be approximately 27,300 feet long and will average 40 feet in height. The approximate footprint of the OCR is depicted in Attachment 1.A., Figure PCN-004. The embankment will be constructed with soil excavated from within the reservoir footprint and from the designated borrow area between Jarvis Creek and the Colorado River. The interior of the embankment structure will be lined with soil cement. The exterior of the embankment will be vegetated. A ditch will be constructed at the toe of the OCR embankment to collect storm water runoff from the exterior slope of the embankment; a service road will be constructed around the OCR; and an emergency spillway will be constructed

in the west OCR embankment. Storm water collected in the ditch along the embankment toe will be conveyed underneath the service road via culverts where it will be returned to sheet flow using level-spreading devices along the southwest side of the OCR; conveyed to a storm water drainage ditch adjacent to the northeast and southeast sides of the OCR; or conveyed to a storm water drainage ditch along the northwest side of the OCR. An existing upland drainage ditch that currently conveys storm water runoff from Texas State Highway 60 to Jarvis Creek through the OCR footprint will be re-routed to flow through the storm water drainage ditch adjacent to the northeast and southeast sides of the OCR, and will discharge to the unnamed tributary to Jarvis Creek.

Construction of the southeast OCR embankment and adjacent service road and storm water drainage ditch will permanently fill the uppermost approximately 100 feet long segment of the unnamed tributary to Jarvis Creek near the southeast Project Area Boundary. Additionally, the banks of the unnamed tributary downstream of the storm water ditch outfall will be cut back above the plane of the OHWM and stabilized using FESLs. Plan, profile and cross-section views of the proposed improvements in the vicinity of the unnamed tributary are provided in Attachment 1.A., Figure PCN-026. Typical FESL construction is depicted in Attachment 1.A., Figure PCN-024.

The storm water drainage ditch constructed along the northwest side of the OCR will outfall to Jarvis Creek immediately downstream of the existing low water crossing at Pump Station Road. The sidewalls of the outfall ditch will be stabilized with FESLs and a rock or concrete rip rap grade control structure will be constructed within the ditch upstream of the creek. The majority of the outfall ditch will be constructed in uplands; however, a small portion of the bank of Jarvis Creek will be excavated below the OHWM at the west end of the outfall ditch. The excavated bank will be stabilized with FESLs that tie into the FESLs that will be constructed to stabilize the creek bank upon removal of the aforementioned low water crossing. Plan and profile views of the storm water outfall ditch to Jarvis Creek from the OCR are provided in Attachment 1.A., Figure PCN-030. The configuration of the bank stabilization measures at the outfall to Jarvis Creek is depicted in Attachment 1.A., Figure PCN-021.

## **4.8 Re-lift Pump Station**

A re-lift pump station will be constructed between the OCR and the existing canal to transfer water between the two structures. The re-lift pump station will be located east of Jarvis Creek and entirely in uplands. No fill or structures will be placed within waters of the U.S. The approximate location of the re-lift pump station is depicted in Attachment 1.A., Figure PCN-004.

## **4.9 Construction Site Layout**

The planned construction site layout is generally depicted in Attachment 1.A., Figure PCN-027. Temporary offices and a maintenance and equipment staging area are currently under construction near the north corner of the Project Area Boundary. Most of the agricultural fields within the Project Area Boundary between Jarvis Creek and the Colorado River are set aside as a potential borrow area for sand and other OCR embankment construction materials. A temporary sand processing area may be placed within the borrow area to process sand excavated from the borrow area. A temporary soil cement batch plant will be located near the center of the OCR footprint. Additionally, portions of the borrow area and the area within the reservoir footprint may also be used for staging equipment and materials. Temporary sediment traps or basins may be constructed within the OCR area, the borrow area, and in the agricultural fields and pastures around the west end of the reservoir. No fill or structures will be placed within waters of the U.S. in association with these features.

## 5. Environmental Effects

### 5.1 Construction Within Waters of the U.S.

Waters of the U.S. subject to Section 404 of the Clean Water Act within the Project Area Boundary are designated in the PJD issued by the USACE Galveston District (Attachment 2), and include the following:

- 3.81 acres of the Colorado River;
- 0.81 acre of Jarvis Creek at the canal flume, bridge and low water crossings;
- 0.33 acre of an unnamed tributary to Jarvis Creek; and
- 0.2 acre of wetland south of the unnamed tributary to Jarvis Creek.

The LCRP was designed to avoid the placement of fill within and other potentially adverse impacts to these jurisdictional waters to the maximum extent practicable. The 0.2-acre wetland will not be impacted by the LCRP. Where impacts to the other waters could not be avoided, the design effort focused on minimizing the potential adverse impacts while still achieving the project goals. Furthermore, the project design also includes components to enhance the function of Jarvis Creek by removing two existing low water crossings and restoring the creek channel at the crossing locations to configurations that are more consistent with the natural creek channel. The project components that involve construction work within waters of the U.S. and LCRA's proposed permitting approach are summarized in the following subsections.

#### 5.1.1 Project Components Subject to Permitting

Project components that entail the placement of new fill and/or the placement or repair of structures below the plane of the OHWM within waters of the U.S. include the following:

- Maintenance of the existing pump station intake structures in the Colorado River;
- Construction of a pipeline and associated outfall to the river;
- Colorado River bank stabilization in the vicinity of the pump station intakes and the new outfall;
- Replacement of the existing concrete canal flume over Jarvis Creek;
- Replacement of the existing low water crossing at Pump Station Road and Jarvis Creek, including temporary fill for a haul road across the creek at Pump Station Road during construction activities;
- Construction of the off-channel reservoir, including the placement of permanent fill within an unnamed tributary to Jarvis Creek and the placement of temporary fill for a haul road across Jarvis Creek at McGowan Road; and
- Jarvis Creek bank stabilization in the vicinity of the Pump Station Road and McGowan Road crossings.

#### 5.1.2 Project Components with Separate Utility

All of the project components identified in the preceding section will contribute to the functionality and reliability of the OCR system. However, each of the following project components provides additional benefits and utility separate from the OCR system:

- Maintaining the existing pump station intake structures will enhance the reliability and efficiency of LCRA's existing irrigation operations and is needed to insure the continuation of irrigation operations.



- Replacing the low water crossing at Pump Station Road, which is prone to flooding, with a bridge over Jarvis Creek will provide all-weather access to the existing pump stations and the Lane City dam located downstream of the pump stations.
- Removing the low water crossings within Jarvis Creek at Pump Station Road and at McGowan Road and restoring the creek channel in each of these two locations will improve drainage and help to alleviate localized flooding within and upstream of the LCRA property.

### 5.1.3 Permit Requirements

LCRA proposes to conduct the construction activities identified herein in accordance with the Nationwide Permits (NWP) identified in the following table. The loss of waters of the U.S. resulting from permanent fill placed within the OHWM during construction of each component is also summarized in the table and is detailed in Attachment 3. The quantities of permanent fill that were provided in the January 29, 2014 PCN package are also provided in Attachment 3 for comparison.

**Summary of Proposed NWPs and Permanently Filled Areas<sup>1</sup>**

<b>Project Component</b>	<b>Proposed NWP</b>	<b>NWP Thresholds</b>	<b>Area of Permanent Fill Below OHWM (acres)</b>
Pump Station Maintenance <sup>2</sup>	None, repair of existing structures only within plane of OHWM	NA	0.00
Pipeline and Outfall Construction	None, new structure only within plane of OHWM	NA	0.00
River Bank Stabilization	NWP 13, Bank Stabilization	500 linear feet of bank; 1 cubic yard of fill per linear foot of bank, average	0.16
Canal Flume Replacement	NWP 3, Maintenance	None specified	0.022
Low Water Crossing Replacement at Pump Station Road <sup>2</sup>	NWP 14, Linear Transportation Projects	0.5 acre fill	0.027
Jarvis Creek Bank Stabilization at Pump Station Road <sup>2</sup>	NWP 13, Bank Stabilization	500 linear feet of bank; 1 cubic yard of fill per linear foot of bank, average	0.021
Temporary Haul Road at McGowan Road and Jarvis Creek	NWP 31, Temporary Construction, Access and Dewatering	None specified	0.00 <sup>3</sup>
Low Water Crossing Removal and Bank Stabilization at Jarvis Creek and McGowan Road <sup>2</sup>	NWP 13, Bank Stabilization	500 linear feet of bank; 1 cubic yard of fill per linear foot of bank, average	0.019
Off-Channel Reservoir Embankment, Perimeter Road, and Storm Water Ditch at Unnamed Tributary to Jarvis Creek	NWP 18, Minor Discharges	0.1 acre fill; 25 cubic yards of fill	0.011
<b>Total</b>			<b>0.260</b>

<sup>1</sup>See Attachment 3 for details.

<sup>2</sup>Project components with additional benefits and separate utility from the OCR system (see Section 5.1.2).

<sup>3</sup>No permanent fill will be placed in the creek for the temporary haul road.

NA: Not Applicable

### **NWP Acreage Limits**

As is noted in the above table and detailed in Attachment 3, the area of permanent fill that will be placed within waters of the U.S. for each project component is less than the threshold limit specified in the NWP proposed to authorize that component. The cumulative threshold limit for authorization of the multiple project components that comprise the LCRP is determined in accordance with NWP General Condition 28, which allows that more than one NWP may be used to authorize a single and complete project “when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit.” Using this approach and the acreage limits for the NWPs identified in the table above, the applicable cumulative threshold limit for fill within waters of the U.S. for the LCRP is 0.5 acre. The cumulative area of permanent fill that will be placed within the OHWM of waters of the U.S. during construction of all project components, including fill associated with the project components that have separate utility, is 0.26 acre and less than the 0.5-acre cumulative threshold limit. As is noted in Attachment 3, the cumulative area of permanent fill within waters of the U.S. that was proposed in the January 29, 2014 PCN package was 0.359 acre.

### **River Bank Stabilization**

River bank stabilization will be required following the pump station intake repairs and construction of the pipeline and outfall. Affected areas to be stabilized are summarized in Attachment 3 and include approximately 435 linear feet (lf) of river bank extending from upstream of the HPS intake pipes to the downstream end of the sheet pile wall associated with the river outfall. The lateral extent of the planned bank stabilization (435 lf) is less than the 500-linear feet threshold specified in NWP 13; however, the average volume of fill below the OHWM per running foot of bank (1.28 cubic yards per linear foot [cy/lf]), exceeds the one cubic yard per linear foot threshold specified in NWP 13. Because of the stabilization methods proposed, LCRA believes the discharge of fill associated with the bank stabilization activities will result in minimal adverse effects to the river. Thus, as is authorized in paragraph (b) of NWP 13, LCRA respectfully requests that the District Engineer waive the one cubic yard per linear foot limit specified in the NWP.

### **Jarvis Creek Bank Stabilization at Pump Station Road**

Upon completion of the infrastructure improvements near Pump Station Road and Jarvis Creek, both banks of Jarvis Creek along an approximately 240 linear feet long stream reach will be stabilized as described in Section 4.5 and depicted in Attachment 1.A., Figures PCN-021, -024, and -025. The type and volume of fill that will be placed within the creek below the plane of the OHWM for each bank stabilization component is summarized in Attachment 3. The average volume of fill that will be placed in the creek per running foot of bank is 0.3 cy/lf. Thus, the planned bank stabilization improvements will not exceed the 500-linear feet threshold or the one cubic yard per linear foot threshold specified in NWP 13.

### **Jarvis Creek Bank Stabilization at McGowan Road**

Upon removal of the low water crossing at McGowan Road and Jarvis Creek, both banks of Jarvis Creek along an approximately 120 linear feet long stream reach will be stabilized as described in Section 4.6 and depicted in Attachment 1.A., Figures PCN-023, -024, and -025. The type and volume of fill that will be placed within the creek below the plane of the OHWM for each bank stabilization component is summarized in Attachment 3. The average volume of fill that will be placed in the creek per running foot of bank is 0.49 cy/lf. Thus, the planned bank stabilization improvements will not exceed either the 500-linear feet threshold or the one cubic yard per linear foot threshold specified in NWP 13.

### **Minor Discharge for OCR Construction**

The volume of fill that will be placed below the plane of the OHWM within the unnamed tributary to Jarvis Creek during construction of the OCR embankment, perimeter road, and associated drainage features is approximately 17.6 cubic yards, and below the 25-cubic yard limit specified in NWP 18.

### **5.1.4 Jarvis Creek Stream Condition Assessment at Pump Station Road**

As described in previous sections of this PCN package, LCRA plans several construction activities in the approximately 240 to 250-foot reach of Jarvis Creek near Pump Station Road. These activities include:

- Removing the existing Lane City Canal flume, low water crossing and timber bridge crossing the creek;
- Constructing a new canal flume and bridge over the creek;
- Constructing a new OCR storm water drainage ditch that will discharge to the creek; and
- Restoring the open channel cross-section of the creek upon removal of the low water crossing and stabilizing the banks of the creek using natural bank restoration measures (FESLs, native plants, etc.).

These activities will result in the placement of approximately 0.07 acre (336.4 cy) of permanent fill below the plane of the OHWM within Jarvis Creek. However, most of the permanent fill (approximately 214.7 cy) will be comprised of native soil temporarily excavated from the creek and then replaced to facilitate the construction of pile caps and pier walls to support the new canal flume and bridge.

To demonstrate that the planned construction activities within the reach of Jarvis Creek near Pump Station Road will not adversely impact the creek, LCRA engaged SWCA Environmental Consultants to conduct a Level 1 Stream Condition Assessment (SCA) to document the current condition of the approximately 250-foot reach of the ephemeral creek and to project the condition of the creek after the planned construction and bank stabilization activities are complete. SWCA conducted the SCA field assessment on March 9, 2015. The SCA was conducted in accordance with the USACE Galveston District's Stream Condition Assessment procedure (USACE 2013). A copy of the report prepared by SWCA (SWCA 2015) is provided in Attachment 4.

The reach of Jarvis Creek in which construction work is planned is designated as Stream Assessment Reach (SAR) 2 in the SWCA report. The Reach Condition Index (RCI) quantified by SWCA for SAR 2 in its current condition is 2.02. Upon completion of the planned construction and bank stabilization work within SAR 2, SWCA estimates that the RCI for SAR 2 will be 2.40. Thus, the condition of SAR 2 is expected to be elevated by the planned improvements. Additionally, as is noted in the SWCA report, no adverse affects to the stream assessment reaches upstream and downstream of SAR 2 are anticipated.

## **5.2 Channel Morphology**

At the request of the USACE Galveston District following submittal of LCRA's January 29, 2014 PCN, LCRA retained CH2M Hill to assess the potential effects of return flows from the LCRP to the Colorado River channel morphology downstream of the planned outfall to the river. A technical memorandum summarizing the assessment (CH2M Hill 2014) was submitted to the USACE Galveston District on April 25, 2014. In the assessment, CH2M Hill concluded that the LCRP and associated diversions from and releases to the Colorado River are not expected to impact the channel morphology of the river downstream of the project. A copy of CH2M Hill's April 24, 2014 technical memorandum is provided in Attachment 5.A.

Since the original assessment was prepared, the river outfall design has been modified as described in Section 4.2 of this submittal. Thus, on April 6, 2015, CH2M Hill prepared an update to the April 24, 2014 technical memorandum (CH2M Hill 2015). In the update, CH2M Hill confirms that the changes to the river outfall design do not change the conclusions of the 2014 assessment. A copy of the April 6, 2015 update is provided in Attachment 5.B.

### **5.3 Federally and State-Listed Threatened and Endangered Species**

Attachment 6 summarizes the potential presence of federally and state-listed threatened and endangered species and other rare species within the Project Area Boundary and nearby area. As is detailed in Attachment 6, no suitable habitat for any federally listed endangered or threatened species exists within or adjacent to the expanded Project Area Boundary. State-listed endangered or threatened species of potential occurrence within the Project Area Boundary include the Texas horned lizard, and timber rattlesnake; however, the proposed activities are unlikely to adversely affect these species.

Suitable habitat for the federal candidate mussel species smooth pimpleback, Texas pimpleback, and Texas fawnsfoot exists within and adjacent to the Project Area Boundary. A survey for live freshwater mussels was conducted in the Colorado River segment that is within and in proximity to the Project Area Boundary within the river in December 2013. As is detailed in Attachment 6, several common species of freshwater mussels and the federal candidate and state-threatened mussel species smooth pimpleback were located in and immediately adjacent to areas in the Colorado River where construction work is planned. Therefore, an Aquatic Resource Relocation Plan will be developed and implemented to relocate mussels from the construction areas prior to and during construction activities.

Bald Eagles may occur in the general area and potential nesting habitat is present within the Project Area Boundary; however, no Bald Eagle nests are present within the Project Area Boundary or within a 660-foot radius beyond the Project Area Boundary. The proposed project is unlikely to result in adverse effects to this species, provided no nests are present during construction activities. LCRA will continue to monitor the Project Area for Bald Eagle nests. If a nest is identified within the Project Area, LCRA will coordinate with the U.S. Fish and Wildlife Service regarding the potential for adverse effects, if deemed appropriate and necessary.

### **5.4 Water Quality**

The Texas Commission on Environmental Quality (TCEQ) has developed a tiered approach for conducting the Clean Water Act Section 401 water quality review and certification for projects subject to Section 404 permitting. Applicants with small projects that impact less than three acres of waters of the U.S. or less than 1500 linear feet of streams and that agree to implement TCEQ-specified best management practices (BMPs) and other TCEQ requirements qualify for Tier 1 review and certification. The cumulative area of permanent fill that will be placed in waters of the U.S., including the Colorado River, Jarvis Creek, and the unnamed tributary to the creek, during construction is 0.26 acre. No fill will be placed in wetlands during project construction. The total length of stream channel that may be impacted by project construction, including temporary fills, is approximately 1045 linear feet, including the following:

- Colorado River -- approximately 435 linear feet measured from upstream of the HPS to the downstream end of the sheet pile wall and related bank stabilization work associated with the river outfall (Attachment 1.A., PCN-005);

- Jarvis Creek at Pump Station Road -- approximately 240 linear feet measured from upstream of the canal flume to downstream of the new storm water outfall and associated bank stabilization and stream channel restoration measures (Attachment 1.A., PCN-021 and PCN-30);
- Jarvis Creek at McGowan Road -- approximately 120 linear feet, including the stream channel restoration area as shown in Attachment 1.A., PCN-023; and
- Unnamed Tributary to Jarvis Creek -- 250 linear feet, including permanent fill from OCR and drainage ditch construction within approximately 100 linear feet of the tributary and approximately 150 feet of bank stabilization measures downstream of the permanent fill and outside the area bounded by the OHWM as shown in Attachment 1.A., PCN-026.

The project meets the Tier 1 criteria for small projects. The project will incorporate at least one of the BMPs under each of the following three categories -- erosion control, sedimentation control, and post-construction total suspended solids control -- at appropriate stages during construction. An executed TCEQ Tier 1 checklist for the project is provided in Attachment 7. A copy of the checklist was forwarded to the TCEQ Water Quality Assessment Section. Additionally, a storm water pollution prevention plan (SWPPP) for the project has been prepared and implemented in accordance with TCEQ's Texas Pollutant Discharge Elimination System (TPDES) General Permit No. TXR150000, generally referred to as the TPDES Construction General Permit. The SWPPP will be updated as necessary as the project progresses.

## 6. Cultural Resources

### 6.1 Previous Archaeological Assessments

LCRA conducted an intensive archaeological survey of the Project Area in 2013, and supplemental archaeological survey investigations in 2014. Draft reports documenting the surveys were submitted to the Texas Historical Commission (THC) and the USACE Galveston District for concurrence, and a final report was prepared in August 2014 (Prikryl et al. 2014).

One site identified during the surveys is considered to be a potentially significant site; however, additional investigation is needed to determine if it is eligible for listing on the National Register of Historic Places (NRHP) or for State Antiquities Landmark (SAL) nomination. As discussed in Section 3.3 of this report, the site has been designated as an avoidance area for the LCRP. A probable historic cemetery was also identified within the Project Area Boundary. The cemetery is not located within the area that will be inundated by the reservoir or covered by the dam embankment and has been designated as an avoidance area during the construction and subsequent operation of the project. LCRA has designated an approximate 50-meter wide radius buffer zone around each site and has enclosed each site with permanent fencing. Although avoidance of the cemetery is recommended, the site is not recommended as eligible for listing on the NRHP or for SAL nomination.

### 6.2 Previous Historic Structures Assessment and Mitigation Plan

SWCA Environmental Consultants conducted an intensive historic structures survey of the LCRA property and a 0.5-mile buffer area around the OCR footprint designated as the Area of Potential Effects (APE) in 2013. The draft survey report and subsequent letter addenda were submitted to the USACE Galveston District and THC in 2013. The report was finalized in June 2014 (Brown and Cynkar 2014). SWCA identified three resources that are assessed as eligible for inclusion in

the NRHP: Pumphouse 1 (the HPS Building which was built in the 1940s), Pumphouse 2 (located northwest of the HPS Building and built ca. 1928), and the portion of the Lane City Canal between the pump station and head lock, which is located about 375 meters southeast of the southeast edge of the LCRA property. All other components of the pump plant and canal and all other resources assessed within the APE were determined to be not eligible for inclusion in the NRHP. Direct and indirect visual impacts and their Adverse Effects on the NRHP-eligible resources that may be caused by the LCRP are addressed in the final report.

On May 12, 2014, LCRA, THC and USACE executed a Memorandum of Agreement (MOA) designating the required mitigation to offset the Adverse Effects to the Lane City Canal and Pumphouse 1 that will be caused by the project. Mitigation is currently in progress under the terms of the MOA.

### **6.3 Cultural Resource Survey of Proposed Fiber Optic Line Construction**

LCRA plans to install an approximately 460-foot long, buried fiber optic cable line that will extend from the existing pumping plant northwest to LCRA's existing telecomm facility. The telecomm facility and part of the proposed trench are located beyond the Project Area Boundary within which the previous cultural resource surveys were conducted. As discussed in Section 3.3 of this submittal, LCRA has expanded the Project Area Boundary to capture the area in which the fiber optic cable will be installed.

In November 2014, LCRA conducted a cultural resource survey of the area in which the fiber optic cable will be installed. No archaeological sites eligible for listing on the NRHP or for formal SAL designation were found within the expanded Project Area Boundary. However, archaeological monitoring will be conducted during the trenching for placement of the buried fiber optic cable within an approximately 40 foot long area at the east end of the trench to further ensure that no subsurface features related to the former 1901-era pumphouse structure are present in the Project Area.

A draft report documenting the survey activities was submitted to the THC on February 3, 2015 (Prikryl et al. 2015). The THC concurred with the assessments and recommendations described in the draft report on February 18, 2015. A copy of the draft report for the USACE Galveston District's review and approval and documentation of the THC's concurrence with the findings of the draft report are provided in Attachment 8.

## **7. Floodplain**

The LCRP is located within the 100-year floodplain designated by the Federal Emergency Management Agency (FEMA) in the Colorado River watershed. To assess the potential impact that the proposed project would have on the floodplain, a FEMA Flood Insurance Rate Map (FIRM) panel and its associated Flood Insurance Study (FIS), dated April 5, 2006, were obtained for the Project Area and vicinity. Floodplain analyses conducted in support of the project indicate that construction of the project will have no adverse effect on the Colorado River floodplain. A hydraulic analysis of Jarvis Creek was also conducted in accordance with the "Wharton County Drainage Master Plan" (Wharton County 2010), and results show no adverse impact to upstream and downstream properties. The Wharton County Floodplain Manager issued a *Development Permit with Drainage Review* (Wharton County 2015) authorizing LCRA to proceed with the project on January 16, 2015.



## 8. Other Permits and Authorizations

In addition to obtaining USACE NWP verification, other permits and authorizations that are required for the project include, but are not limited to, those listed below.

- Texas Commission on Environmental Quality (TCEQ) -- *An Amendment to a Certificate of Adjudication* (Certificate No. 14-5476C) authorizing water storage and a designated storage location was granted to LCRA by the TCEQ on February 13, 2014 (TCEQ 2014).
- TCEQ -- Dam Safety Program approval (Design documents for the OCR embankment and appurtenant facilities were submitted to the TCEQ for review on March 2, 2015. LCRA received comments from the TCEQ on March 25, 2015. The design documents will be revised to address the TCEQ's comments, as appropriate, and the final design will be submitted to the TCEQ for approval. Revision of the design documents to address the TCEQ's comments, which are relatively minor, will not affect the information provided in this PCN submittal.).
- Texas Parks & Wildlife Department (TPWD) -- Approval of Aquatic Resource Relocation Plan for freshwater mussels (see Attachment 4, submittal pending).
- Texas Historical Commission/State Historic Preservation Officer -- Memorandum of Agreement and Mitigation Plan to mitigate for adverse impacts to cultural resources (see Section 6.2).
- Wharton County Floodplain Administrator -- See Section 7.
- TCEQ -- Notices of Intent to obtain permit coverage for storm water discharges under Texas Pollutant Discharge Elimination System (TPDES) General Permit No. TXR150000 (TPDES Construction General Permit) submitted to the TCEQ in February 2015.

## 9. References

- Barfuss, Steven L., P.E., Zac Sharp and Jordan Jarrett, 2014. *Physical Model Study of the LCRA Lane City Reservoir River Outfall*, Utah Water Research Laboratory Hydraulics Report No. 3094, Utah State University, Logan, Utah, November 2014.
- Brown, Kristen and Grace Cynkar, 2014. *Intensive Historic Structures Survey for the Lower Basin Reservoir at Lane City Project, Wharton County, Texas*. SWCA Environmental Consultants, SWCA Cultural Resource Report No. 13-218, June 2014.
- CH2M Hill 2014. *Lower Basin Reservoir Project -- Characterization of Off-Channel Reservoir Return Flows into the Colorado River and Implications for Channel Morphology*, CH2M Hill, April 24, 2014.
- CH2M Hill 2015. *Lane City Reservoir Project -- Update to Characterization of Off-Channel Reservoir Return Flows into the Colorado River and Implications for Channel Morphology*, CH2M Hill, March 18, 2015.
- Prikryl, Daniel J., Andrew F. Malof, Charles A. Hixson and Erik A. Schroeder, 2014. *An Intensive Archaeological Survey of the LCRA's Proposed Lower Basin Reservoir Project at Lane City, Wharton County, Texas* Report of Investigations No. 19, Lower Colorado River Authority, Austin, Texas, August 2014.

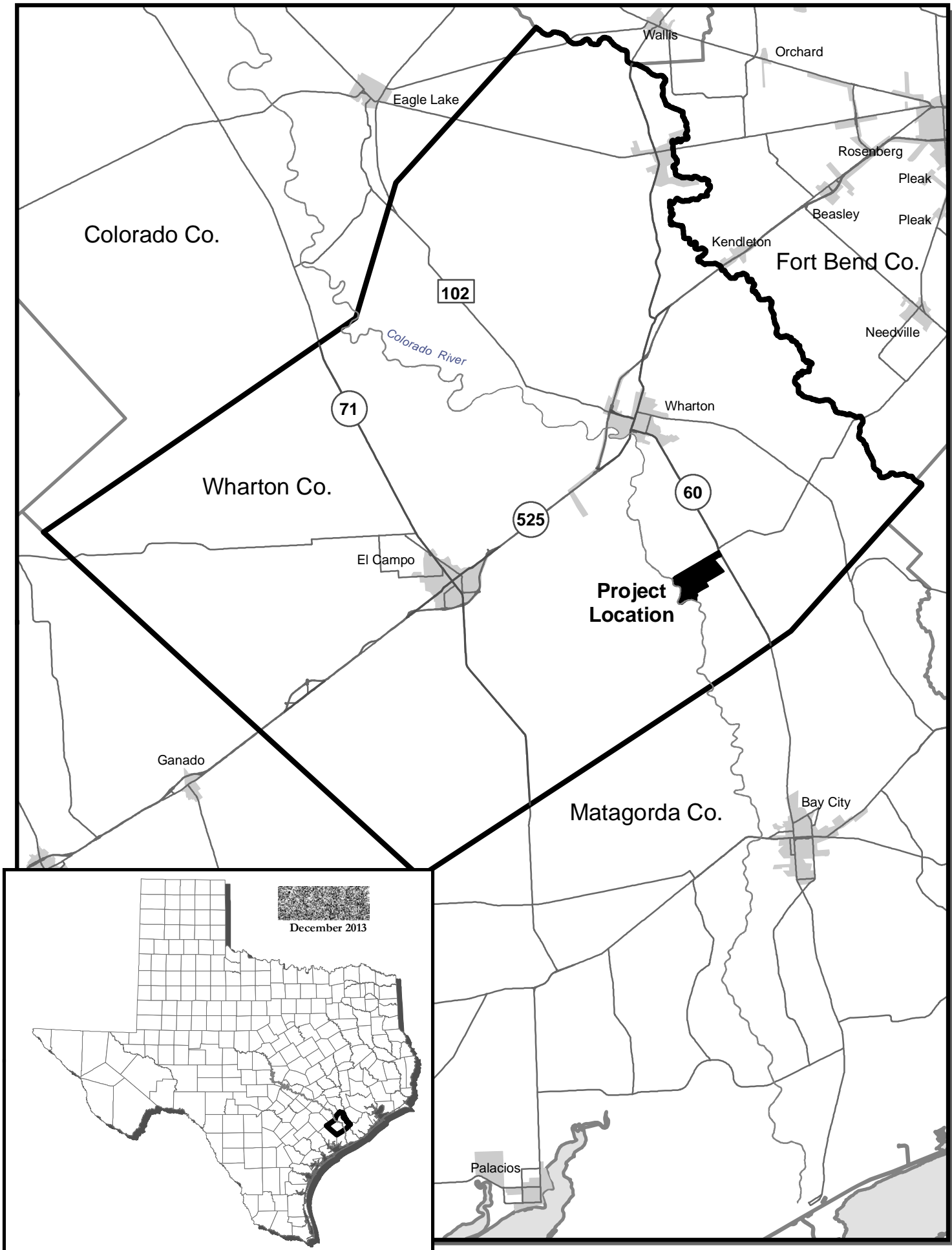
- Prikryl, Daniel J., and Andrew F. Malof, 2015. *A Cultural Resources Survey of the Lower Colorado River Authority's Fiber Optic Line Construction at the Lane City Reservoir Project, Wharton County, Texas*, DRAFT, Interim Report 8.14. Lower Colorado River Authority, Austin, Texas, January 2015.
- SWCA 2015. *USACE Galveston District Level 1 Stream Condition Assessment for Jarvis Creek: Lane City Reservoir Project, Wharton County, Texas, USACE Permit SWG-2013-00229*, SWCA Environmental Consultants, March 23, 2015.
- TCEQ 2014. *Amendment to a Certificate of Adjudication*, Certificate No. 14-5476C, Texas Commission on Environmental Quality, February 13, 2014.
- TPWD, undated. *Aquatic Resource Relocation Plan* guidelines. Texas Parks & Wildlife Department.
- TWDB 2006. *Region K Water Plan for the Lower Colorado Regional Water Planning Group*. Texas Water Development Board.
- TWDB 2010a. *2011 Region K Water Plan for the Lower Colorado Regional Water Planning Group*. Texas Water Development Board.
- TWDB 2012. *Water for Texas, 2012 State Water Plan*. Texas Water Development Board.
- USACE 2013. *U.S. Army Corps of Engineers -- Galveston District Stream Condition Assessment 2013*, U.S. Army Corps of Engineers, June 2013.
- Wharton County 2010. *Wharton County Drainage Master Plan*. Wharton County, Texas.
- Wharton County 2015. *Development Permit with Drainage Review*, Permit No. 3942. Wharton County Permit & Inspection Department, Wharton, Texas, issued January 16, 2015.

**Attachment 1**  
**Figures**

## A. April 6, 2015 Revised Figures

## LIST OF FIGURES

PCN-001	PROJECT LOCATION
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PCN-003	PROJECT AREA MAP
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PCN-007	HORIZONTAL PUMP STATION REPLACEMENT OF SUCTION PIPING SECTION
PCN-008	RESERVED
PCN-009	VERTICAL PUMP STATION SITE PLAN
PCN-010	VERTICAL TURBINE PUMP STATION INTAKE TOWER REPAIR PLAN
PCN-011	VERTICAL TURBINE PUMP STATION INTAKE TOWER REPAIR SECTION
PCN-012	RIVER OUTFALL SITE PLAN
PCN-013	RIVER OUTFALL PIPELINE PROFILE
PCN-014	RIVER OUTFALL DISCHARGE STRUCTURE PLANS AND SECTION
PCN-015	RIVER OUTFALL UPPER SLOPE STABILIZATION AND FESL DETAIL
PCN-016	RIVER OUTFALL TREMIE SLAB AND SHEET PILE SECTION
PCN-017	PUMP STATION ROAD JARVIS CREEK BRIDGE AND CANAL FLUME PLAN
PCN-018	PUMP STATION ROAD JARVIS CREEK BRIDGE SECTION
PCN-019	LANE CITY CANAL FLUME SECTION
PCN-020	PUMP STATION ROAD JARVIS CREEK TEMPORARY HAUL ROAD CROSSING PLAN AND SECTION
PCN-021	LANE CITY CANAL FLUME AND PUMP STATION ROAD JARVIS CREEK CROSSING AND STORM WATER OUTFALL TO JARVIS CREEK RESTORATION SITE PLAN
PCN-022	McGOWAN ROAD JARVIS CREEK TEMPORARY HAUL ROAD CROSSING PLAN AND SECTION
PCN-023	McGOWAN ROAD JARVIS CREEK CROSSING RESTORATION SITE PLAN
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PCN-025	PUMP STATION ROAD AND McGOWAN ROAD JARVIS CREEK RESTORATION SECTIONS
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PCN-027	GENERAL CONSTRUCTION SITE LAYOUT
PCN-028	RESERVED
PCN-029	RESERVED
PCN-030	OFF CHANNEL RESERVOIR STORM WATER OUTFALL TO JARVIS CREEK PLAN AND PROFILE



**PCN-001 Project Location**  
**LCRA Lane City Reservoir Project Wharton County, Texas**  
**USACE Permit No. SWG-2013-00229**





0 500 1,000 2,000 Feet

To Lane City

Hawes

CR 120

CR 116

CR 147

TX-60

Jarvis Creek

LCRA PROPERTY BOUNDARY

Colorado River

CR 114

Goode

**PCN-002 Site Map**  
**LCRA Lane City Reservoir Project**  
**Wharton County, Texas**  
**USACE Permit No. SWG-2013-00229**



INSERT 2



INSERT 1

SEE  
INSERT 1



SEE INSERT 2



SEE  
INSERT 3



INSERT 4












SEE  
INSERT 4



INSERT 3



**Legend**

-  Waterbody Segment, Jarvis Creek OHWM
-  Canal, No USACE Jurisdiction
-  Colorado River OHWM
-  Ditch/Water Feature, No USACE Jurisdiction
-  Jarvis Creek East Top of Bank
-  Jurisdictional Waterbody Centerline
-  Permanent Avoidance Areas
-  Wetland
-  Project Area Boundary

0 500 1,000 2,000 Feet  
scale for overall map



**PCN-003 Project Area Map**  
**LCRA Lane City Reservoir Project**  
**Wharton County, Texas**  
**USACE Permit No. SWG-2013-00229**

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# Lane City Reservoir Project

## Engineering Drawings for PCN Application

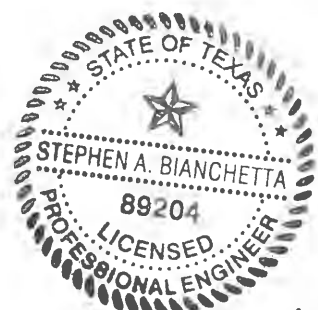
Prepared for

**Lower Colorado River Authority**

April 3, 2015

**CH2MHILL®**

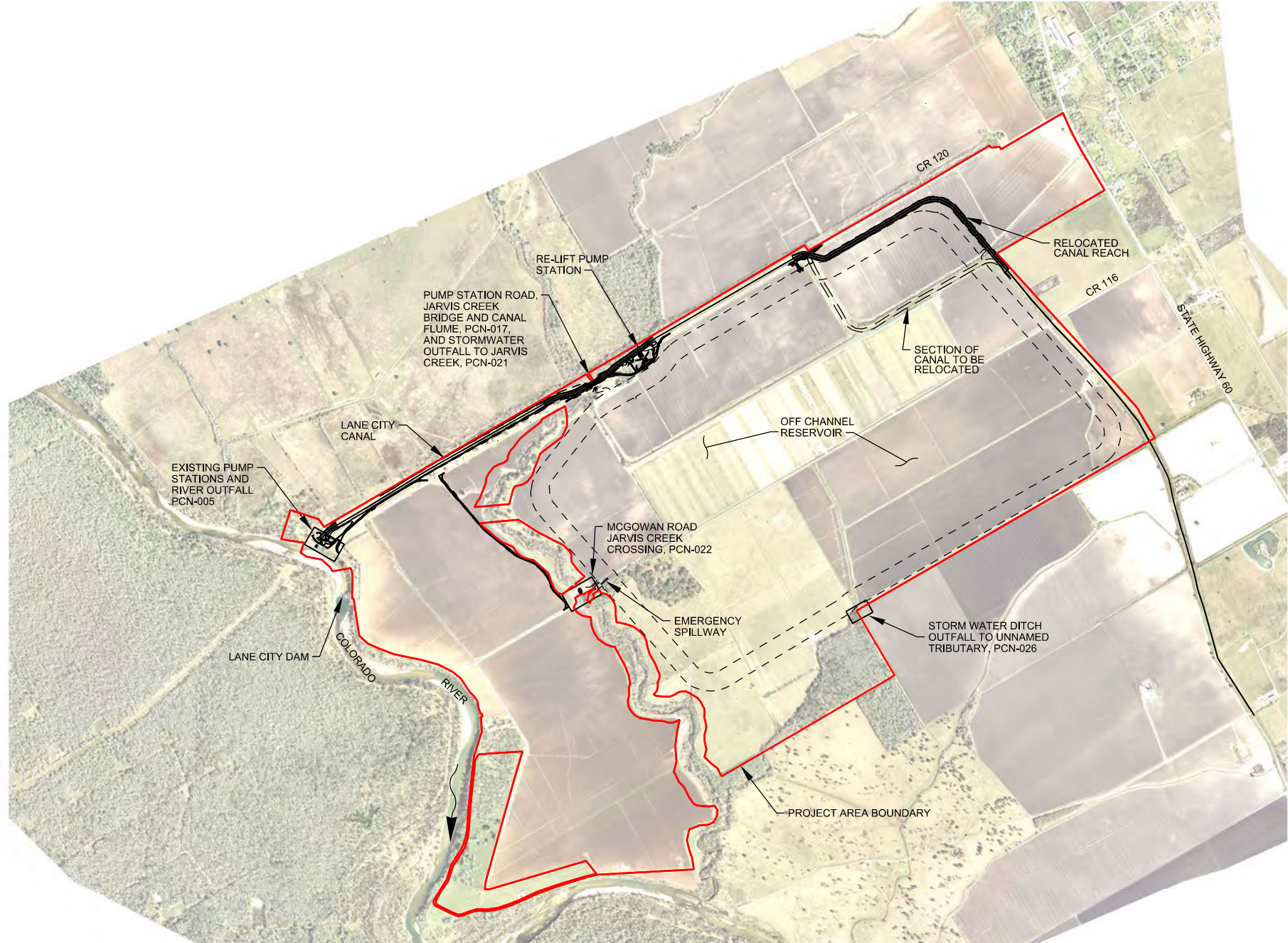
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Austin, TX 78759



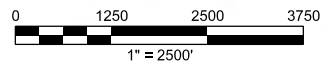
*Stephen A. Bianchetta*  
4-3-15

Not for construction. This document is released  
for permitting purposes only, under the authority of Stephen A. Bianchetta,  
P.E. No. 89204, on April 3, 2015.





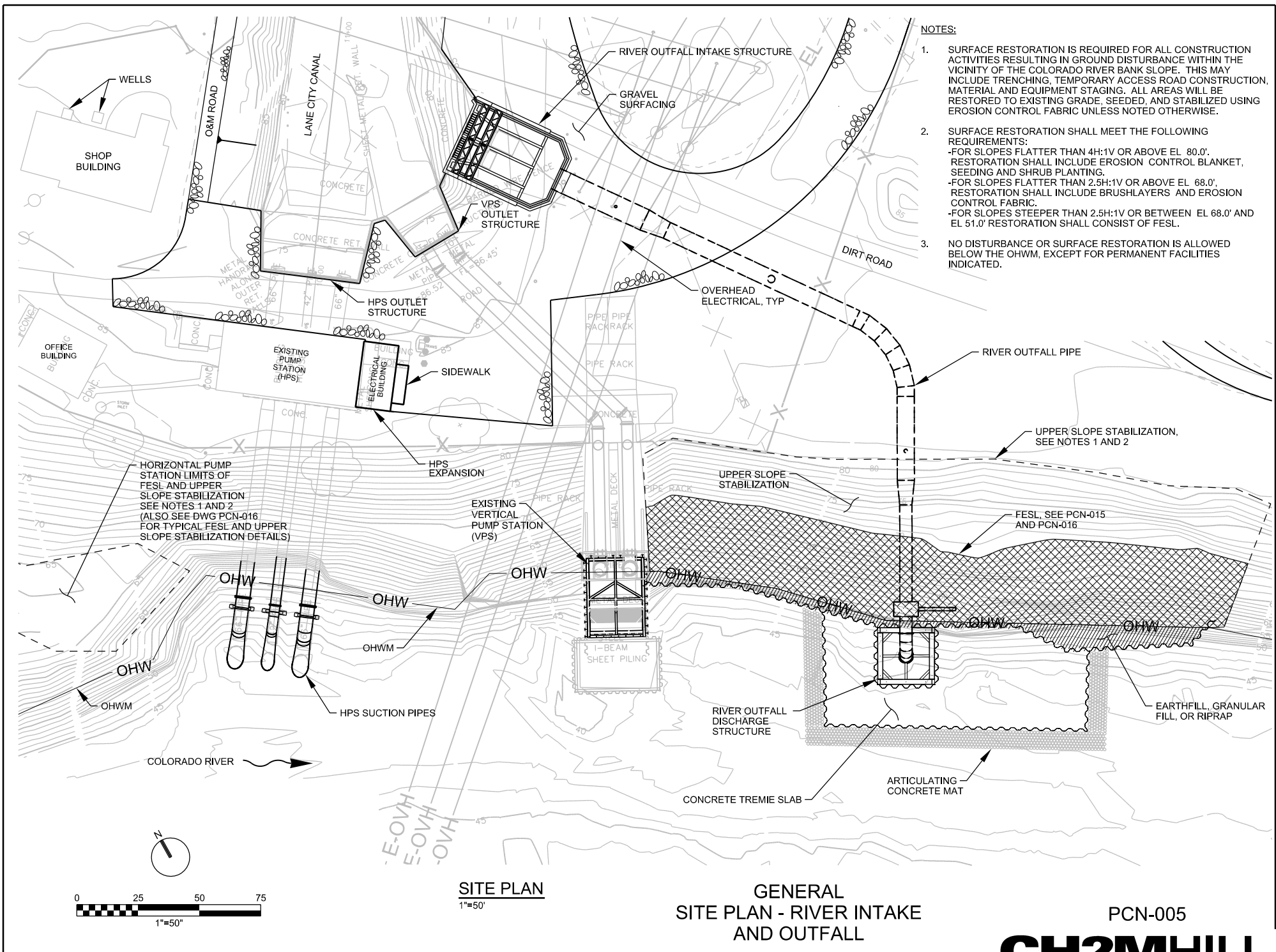
RE-LIFT PUMP STATION  
 PUMP STATION ROAD, JARVIS CREEK BRIDGE AND CANAL FLUME, PCN-017, AND STORMWATER OUTFALL TO JARVIS CREEK, PCN-021  
 LANE CITY CANAL  
 EXISTING PUMP STATIONS AND RIVER OUTFALL PCN-005  
 LANE CITY DAM  
 COLORADO RIVER  
 MCGOWAN ROAD JARVIS CREEK CROSSING, PCN-022  
 EMERGENCY SPILLWAY  
 OFF CHANNEL RESERVOIR  
 SECTION OF CANAL TO BE RELOCATED  
 RELOCATED CANAL REACH  
 CR 120  
 CR 116  
 STATE HIGHWAY 60  
 STORM WATER DITCH OUTFALL TO UNNAMED TRIBUTARY, PCN-026  
 PROJECT AREA BOUNDARY



**GENERAL  
 OVERALL SITE  
 AND ACCESS PLAN**

PCN-004





**NOTES:**

1. SURFACE RESTORATION IS REQUIRED FOR ALL CONSTRUCTION ACTIVITIES RESULTING IN GROUND DISTURBANCE WITHIN THE VICINITY OF THE COLORADO RIVER BANK SLOPE. THIS MAY INCLUDE TRENCHING, TEMPORARY ACCESS ROAD CONSTRUCTION, MATERIAL AND EQUIPMENT STAGING. ALL AREAS WILL BE RESTORED TO EXISTING GRADE, SEEDED, AND STABILIZED USING EROSION CONTROL FABRIC UNLESS NOTED OTHERWISE.
2. SURFACE RESTORATION SHALL MEET THE FOLLOWING REQUIREMENTS:
  - FOR SLOPES FLATTER THAN 4H:1V OR ABOVE EL. 80.0', RESTORATION SHALL INCLUDE EROSION CONTROL BLANKET, SEEDING AND SHRUB PLANTING.
  - FOR SLOPES FLATTER THAN 2.5H:1V OR ABOVE EL. 68.0', RESTORATION SHALL INCLUDE BRUSHLAYERS AND EROSION CONTROL FABRIC.
  - FOR SLOPES STEEPER THAN 2.5H:1V OR BETWEEN EL. 68.0' AND EL. 51.0' RESTORATION SHALL CONSIST OF FESL.
3. NO DISTURBANCE OR SURFACE RESTORATION IS ALLOWED BELOW THE OHWM, EXCEPT FOR PERMANENT FACILITIES INDICATED.

HORIZONTAL PUMP STATION LIMITS OF FESL AND UPPER SLOPE STABILIZATION SEE NOTES 1 AND 2 (ALSO SEE DWG PCN-016 FOR TYPICAL FESL AND UPPER SLOPE STABILIZATION DETAILS)

**SITE PLAN**  
1"=50'

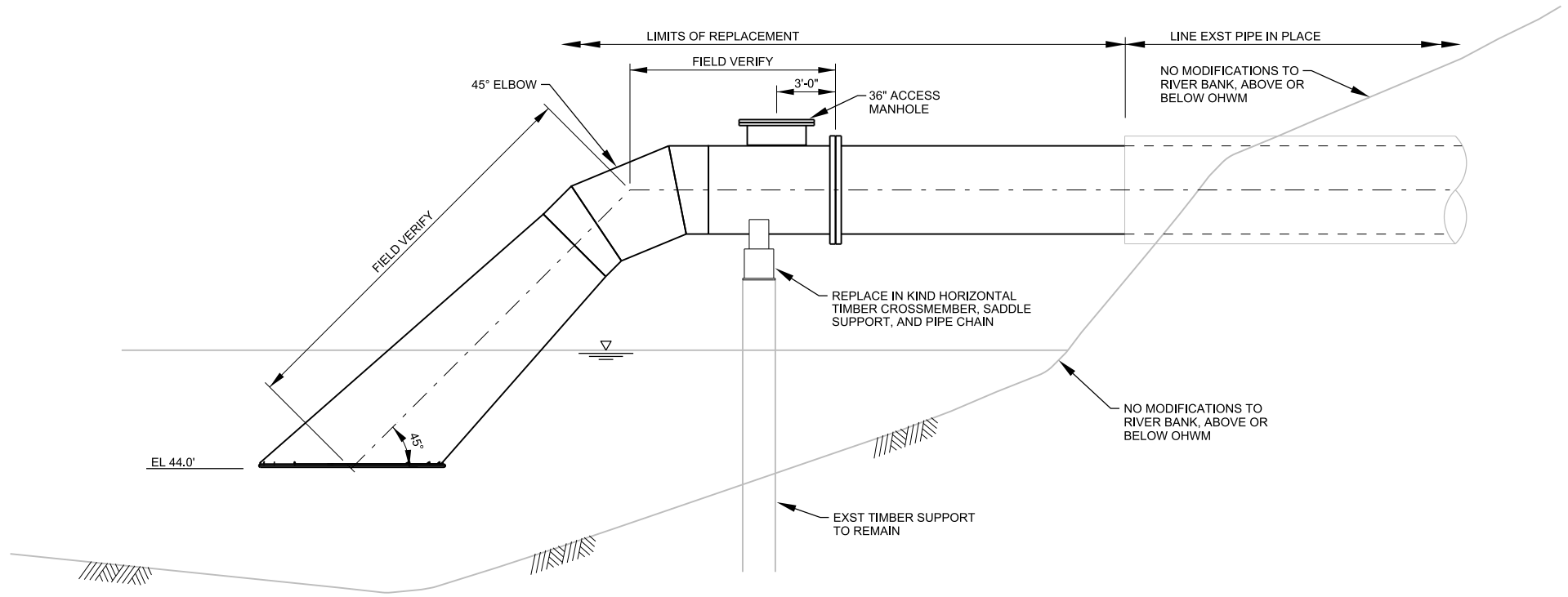
**GENERAL SITE PLAN - RIVER INTAKE AND OUTFALL**

PCN-005









(A) SECTION  
 NTS  
 PCN-006

PCN-007



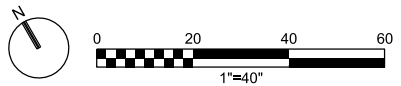
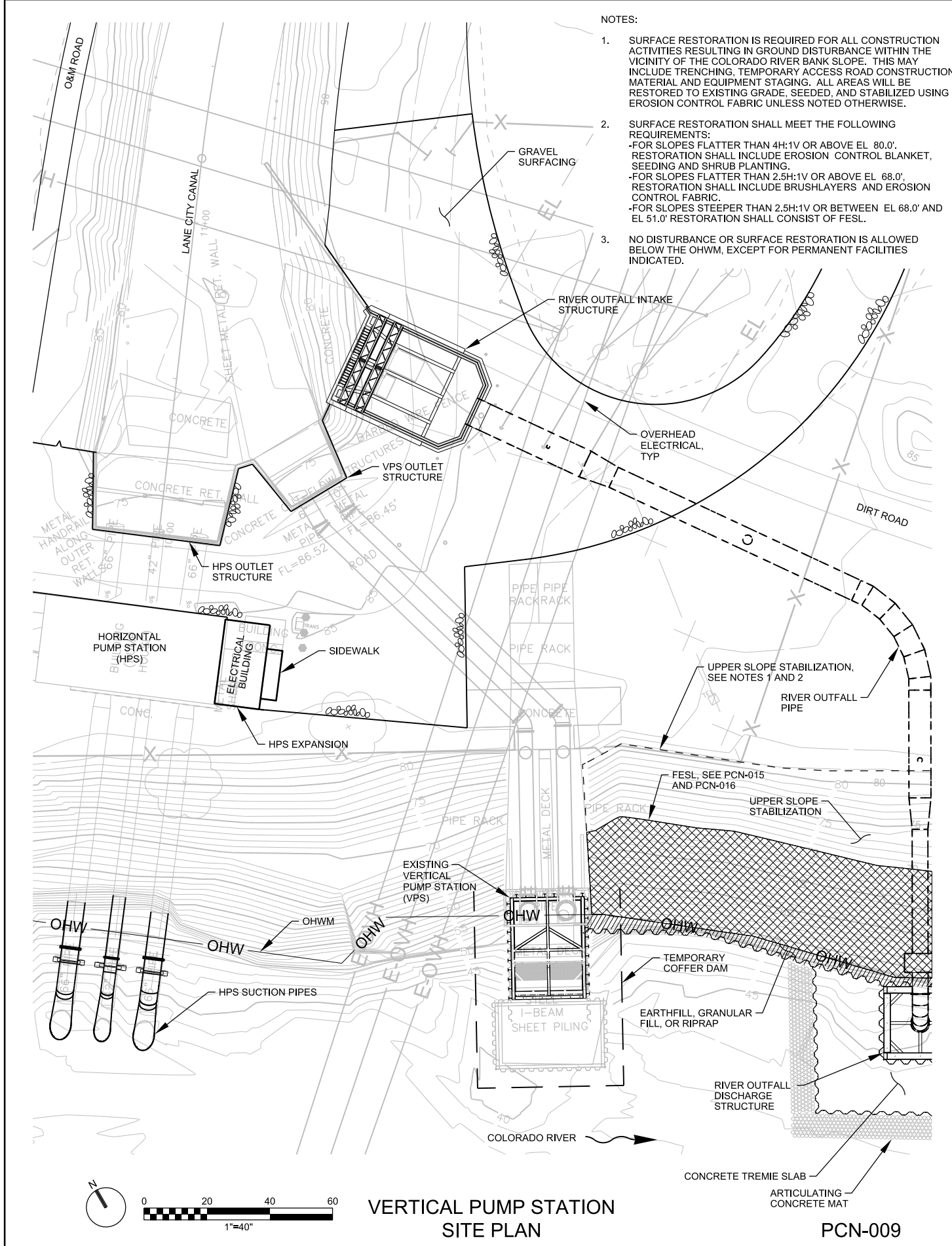
RESERVED

PCN-008

**CH2MHILL**®

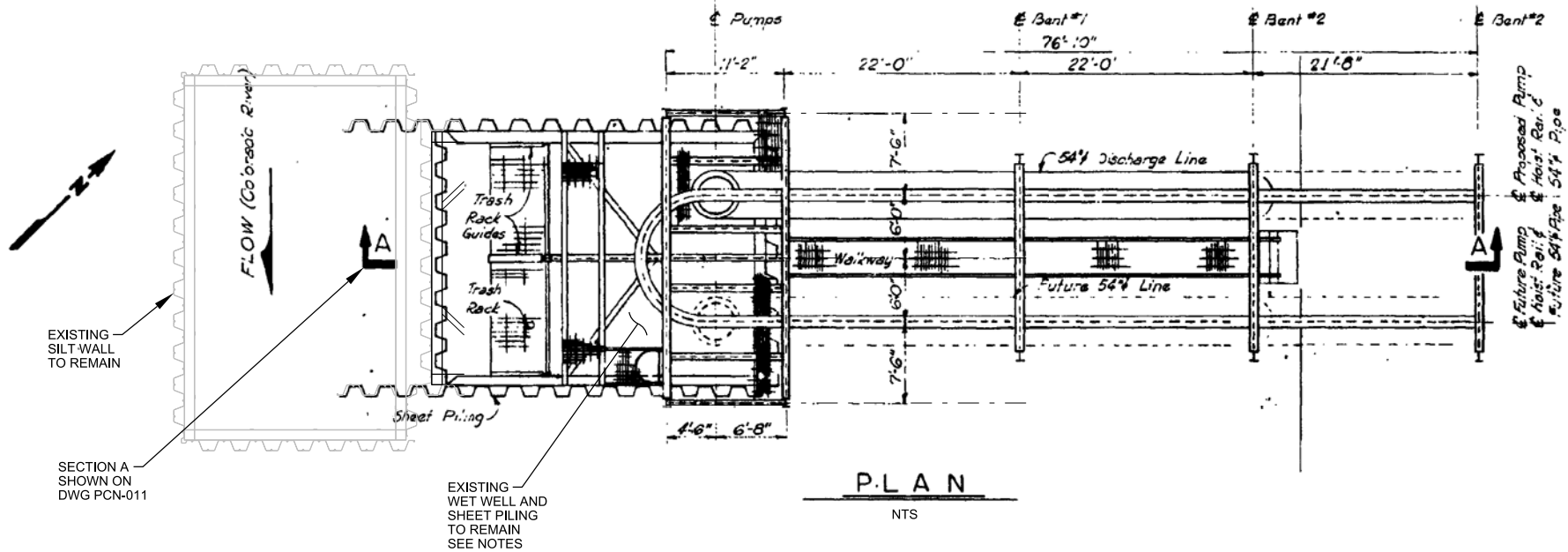
NOTES:

1. SURFACE RESTORATION IS REQUIRED FOR ALL CONSTRUCTION ACTIVITIES RESULTING IN GROUND DISTURBANCE WITHIN THE VICINITY OF THE COLORADO RIVER BANK SLOPE. THIS MAY INCLUDE TRENCHING, TEMPORARY ACCESS ROAD CONSTRUCTION, MATERIAL AND EQUIPMENT STAGING. ALL AREAS WILL BE RESTORED TO EXISTING GRADE, SEEDED, AND STABILIZED USING EROSION CONTROL FABRIC UNLESS NOTED OTHERWISE.
2. SURFACE RESTORATION SHALL MEET THE FOLLOWING REQUIREMENTS:  
 -FOR SLOPES FLATTER THAN 4H:1V OR ABOVE EL. 80.0', RESTORATION SHALL INCLUDE EROSION CONTROL BLANKET, SEEDING AND SHRUB PLANTING.  
 -FOR SLOPES FLATTER THAN 2.5H:1V OR ABOVE EL. 68.0', RESTORATION SHALL INCLUDE BRUSHLAYERS AND EROSION CONTROL FABRIC.  
 -FOR SLOPES STEEPER THAN 2.5H:1V OR BETWEEN EL. 68.0' AND EL. 51.0' RESTORATION SHALL CONSIST OF FESL.
3. NO DISTURBANCE OR SURFACE RESTORATION IS ALLOWED BELOW THE OHWM, EXCEPT FOR PERMANENT FACILITIES INDICATED.



VERTICAL PUMP STATION  
SITE PLAN

PCN-009



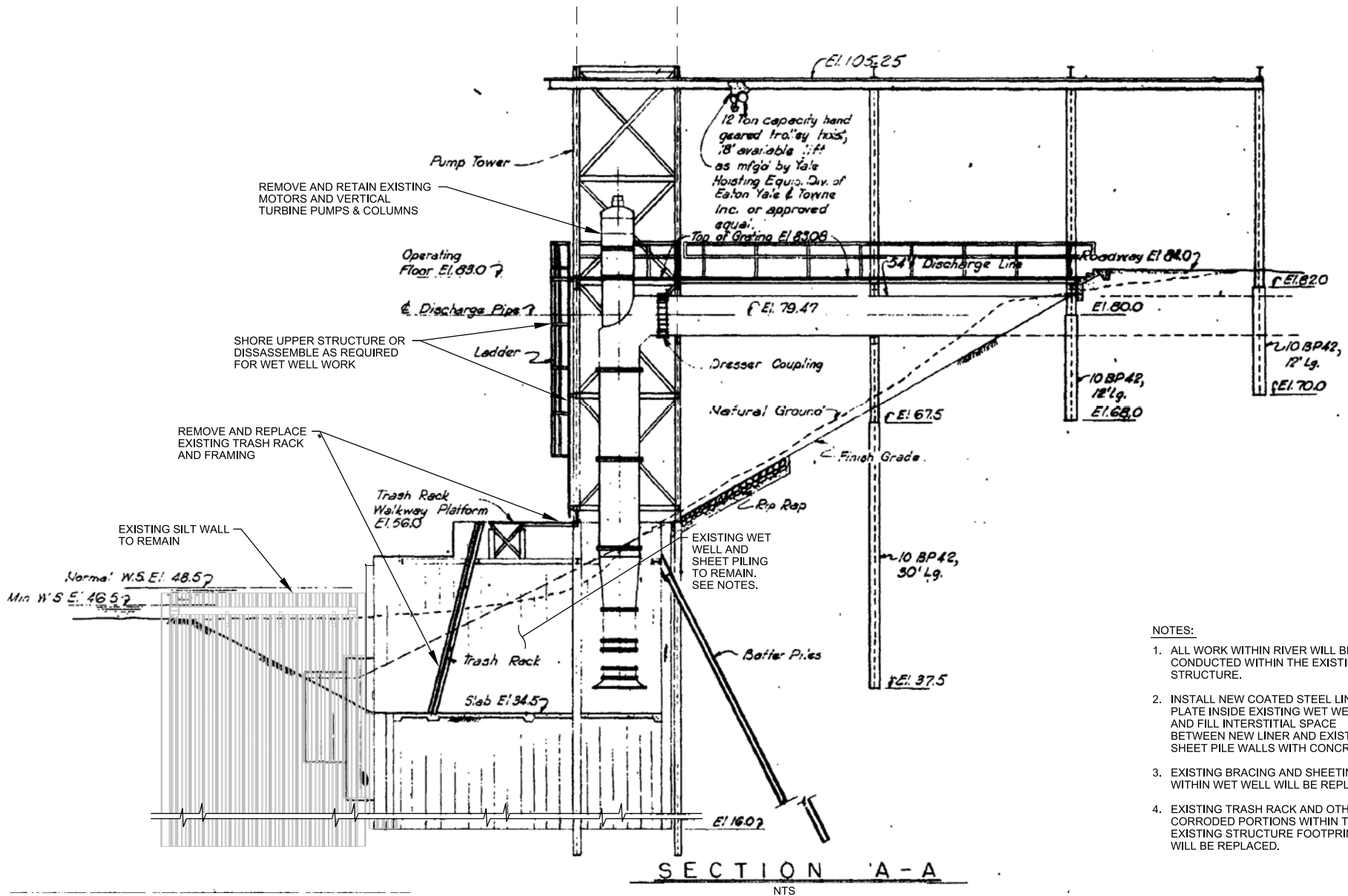
NOTES:

1. ALL WORK WITHIN THE RIVER WILL BE CONDUCTED WITHIN THE EXISTING STRUCTURE.
2. EXISTING BRACING AND SHEETING WITHIN WET WELL WILL BE REPLACED.
3. EXISTING TRASH RACK AND OTHER CORRODED PORTIONS WITHIN THE EXISTING STRUCTURE FOOTPRINT WILL BE REPLACED.

VERTICAL TURBINE PUMP STATION  
INTAKE TOWER REPAIR PLAN

PCN-010

**CH2MHILL**



REMOVE AND RETAIN EXISTING MOTORS AND VERTICAL TURBINE PUMPS & COLUMNS

SHORE UPPER STRUCTURE OR DISSASSEMBLE AS REQUIRED FOR WET WELL WORK

REMOVE AND REPLACE EXISTING TRASH RACK AND FRAMING

EXISTING SILT WALL TO REMAIN

12 Ton capacity hand geared trolley hoist, 18' available lift as mfg'd by Yale Hoisting Equip. Div. of Eaton Yale & Towne Inc. or approved equal.

Top of Grating E1.830.8

34" Discharge Line

Roadway E1.840.7

E1.820

Operating Floor E1.830.7

6" Discharge Pipe

E1.79.47

E1.80.0

10 BP42, 12' Lg. E1.70.0

Ladder

Dresser Coupling

Natural Ground

E1.67.5

Finish Grade

Rip Rap

Trash Rack Walkway Platform E1.56.0

EXISTING WET WELL AND SHEET PILING TO REMAIN. SEE NOTES.

10 BP42, 30' Lg. E1.37.5

Butter Piles

Trash Rack

Slab E1.34.5

E1.160.2

SECTION A-A

NTS

- NOTES:
1. ALL WORK WITHIN RIVER WILL BE CONDUCTED WITHIN THE EXISTING STRUCTURE.
  2. INSTALL NEW COATED STEEL LINER PLATE INSIDE EXISTING WET WELL AND FILL INTERSTITIAL SPACE BETWEEN NEW LINER AND EXISTING SHEET PILE WALLS WITH CONCRETE.
  3. EXISTING BRACING AND SHEETING WITHIN WET WELL WILL BE REPLACED.
  4. EXISTING TRASH RACK AND OTHER CORRODED PORTIONS WITHIN THE EXISTING STRUCTURE FOOTPRINT WILL BE REPLACED.

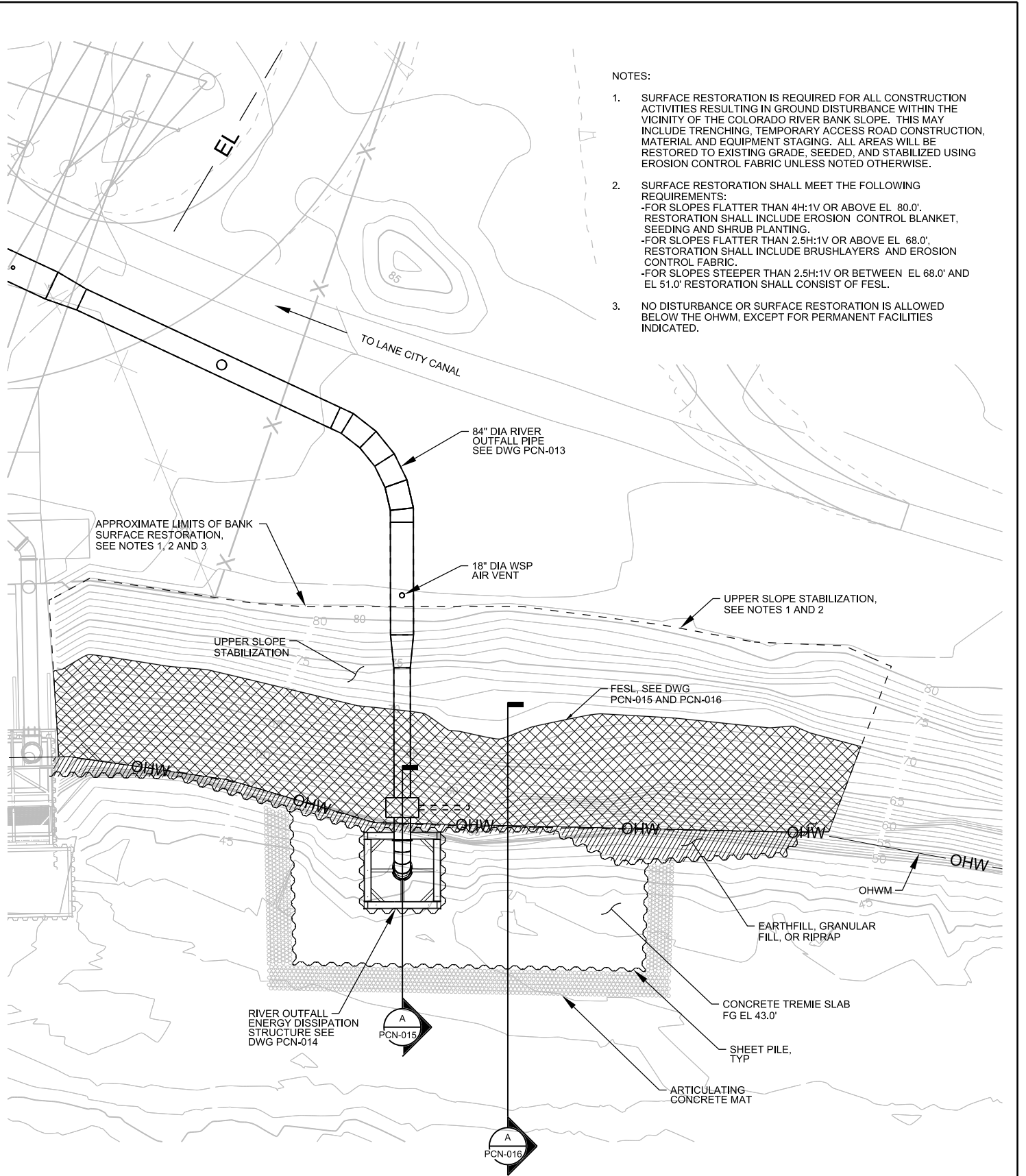
VERTICAL TURBINE PUMP STATION INTAKE TOWER REPAIR SECTION

PCN-011



NOTES:

1. SURFACE RESTORATION IS REQUIRED FOR ALL CONSTRUCTION ACTIVITIES RESULTING IN GROUND DISTURBANCE WITHIN THE VICINITY OF THE COLORADO RIVER BANK SLOPE. THIS MAY INCLUDE TRENCHING, TEMPORARY ACCESS ROAD CONSTRUCTION, MATERIAL AND EQUIPMENT STAGING. ALL AREAS WILL BE RESTORED TO EXISTING GRADE, SEEDED, AND STABILIZED USING EROSION CONTROL FABRIC UNLESS NOTED OTHERWISE.
2. SURFACE RESTORATION SHALL MEET THE FOLLOWING REQUIREMENTS:  
 -FOR SLOPES FLATTER THAN 4H:1V OR ABOVE EL. 80.0', RESTORATION SHALL INCLUDE EROSION CONTROL BLANKET, SEEDING AND SHRUB PLANTING.  
 -FOR SLOPES FLATTER THAN 2.5H:1V OR ABOVE EL. 68.0', RESTORATION SHALL INCLUDE BRUSHLAYERS AND EROSION CONTROL FABRIC.  
 -FOR SLOPES STEEPER THAN 2.5H:1V OR BETWEEN EL. 68.0' AND EL. 51.0' RESTORATION SHALL CONSIST OF FESL.
3. NO DISTURBANCE OR SURFACE RESTORATION IS ALLOWED BELOW THE OHWM, EXCEPT FOR PERMANENT FACILITIES INDICATED.



APPROXIMATE LIMITS OF BANK SURFACE RESTORATION, SEE NOTES 1, 2 AND 3

84" DIA RIVER OUTFALL PIPE SEE DWG PCN-013

18" DIA WSP AIR VENT

UPPER SLOPE STABILIZATION

UPPER SLOPE STABILIZATION, SEE NOTES 1 AND 2

FESL, SEE DWG PCN-015 AND PCN-016

EARTHFILL, GRANULAR FILL, OR RIPRAP

RIVER OUTFALL ENERGY DISSIPATION STRUCTURE SEE DWG PCN-014

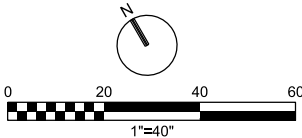
A  
PCN-015

CONCRETE TREMIE SLAB FG EL 43.0'

SHEET PILE, TYP

ARTICULATING CONCRETE MAT

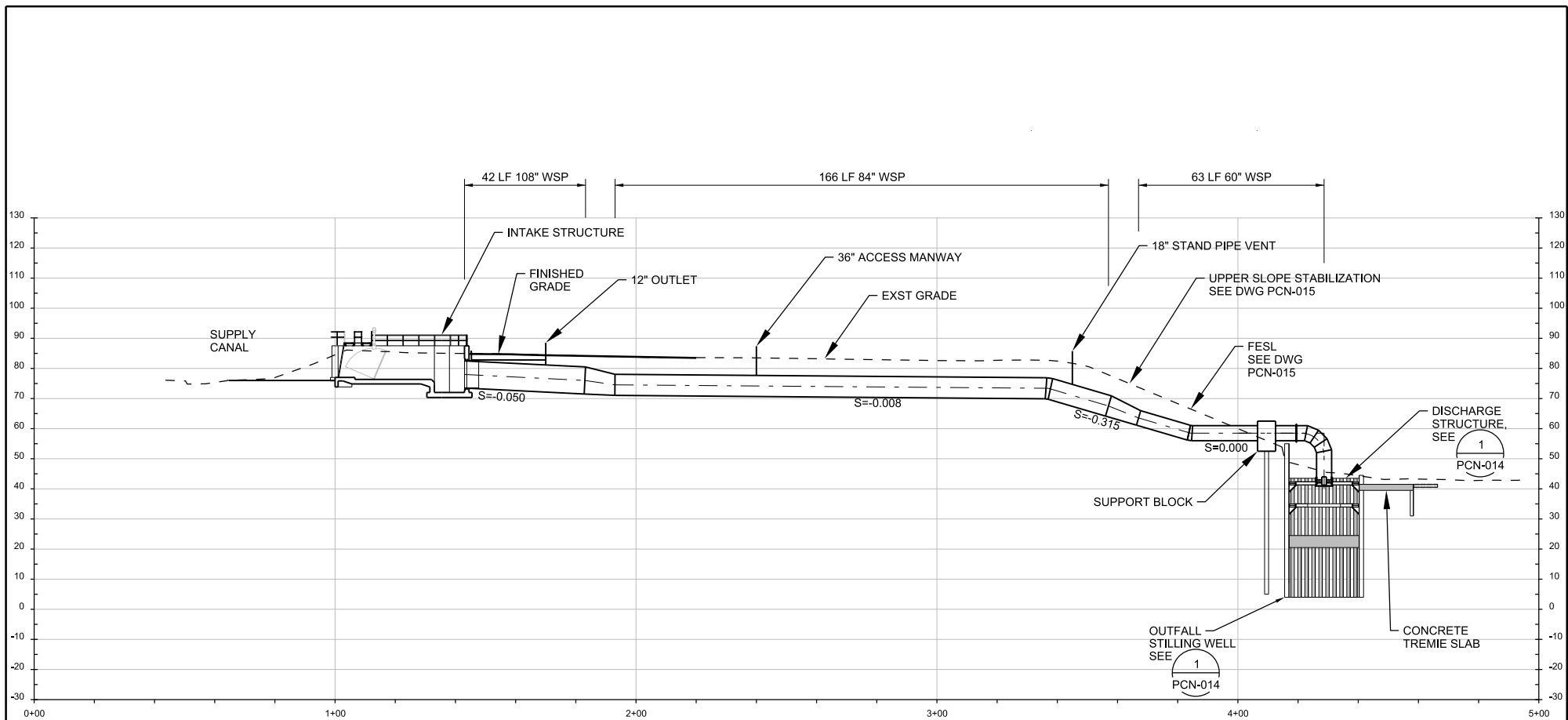
A  
PCN-016



RIVER OUTFALL SITE PLAN

PCN-012





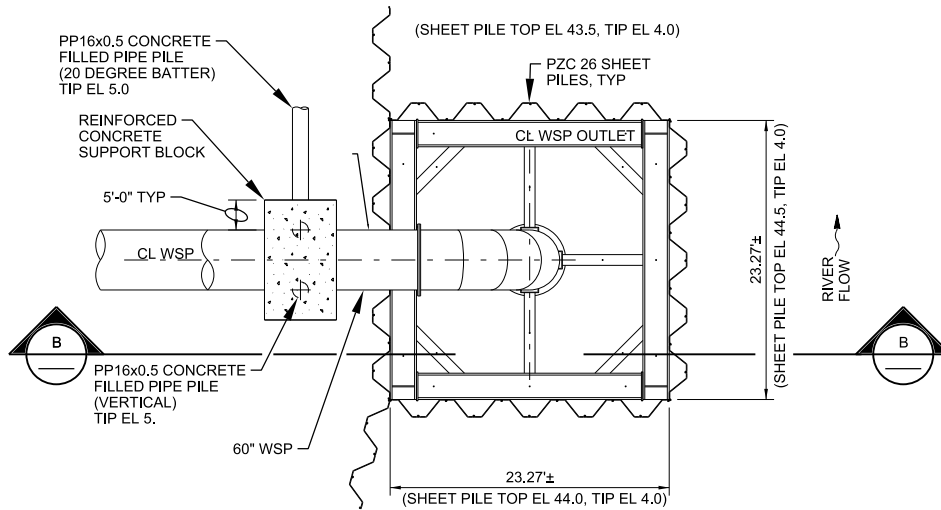
**RIVER OUTFALL PIPE PROFILE**

HORIZ: 1"=50'  
VERT: 1"=25'

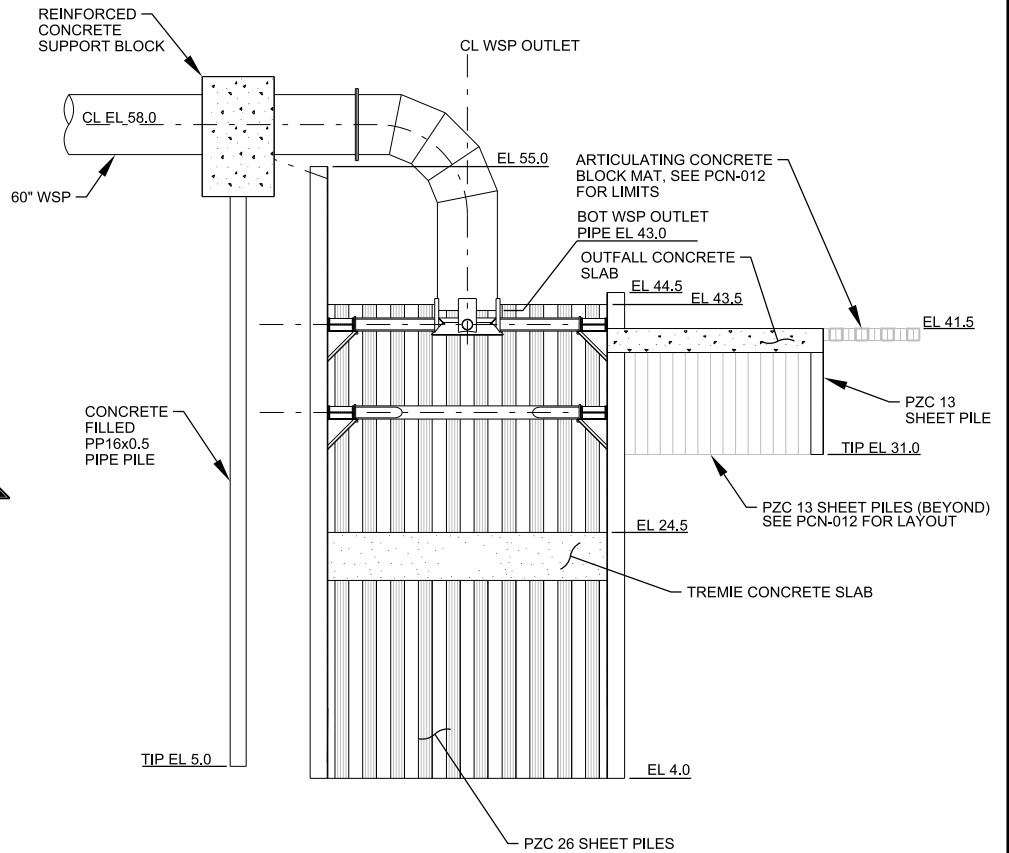
**RIVER OUTFALL  
PIPELINE PROFILE**

PCN-013

**CH2MHILL®**



**A** **STILLING WELL PLAN**  
 1/8" = 1'-0"  
 PCN-013

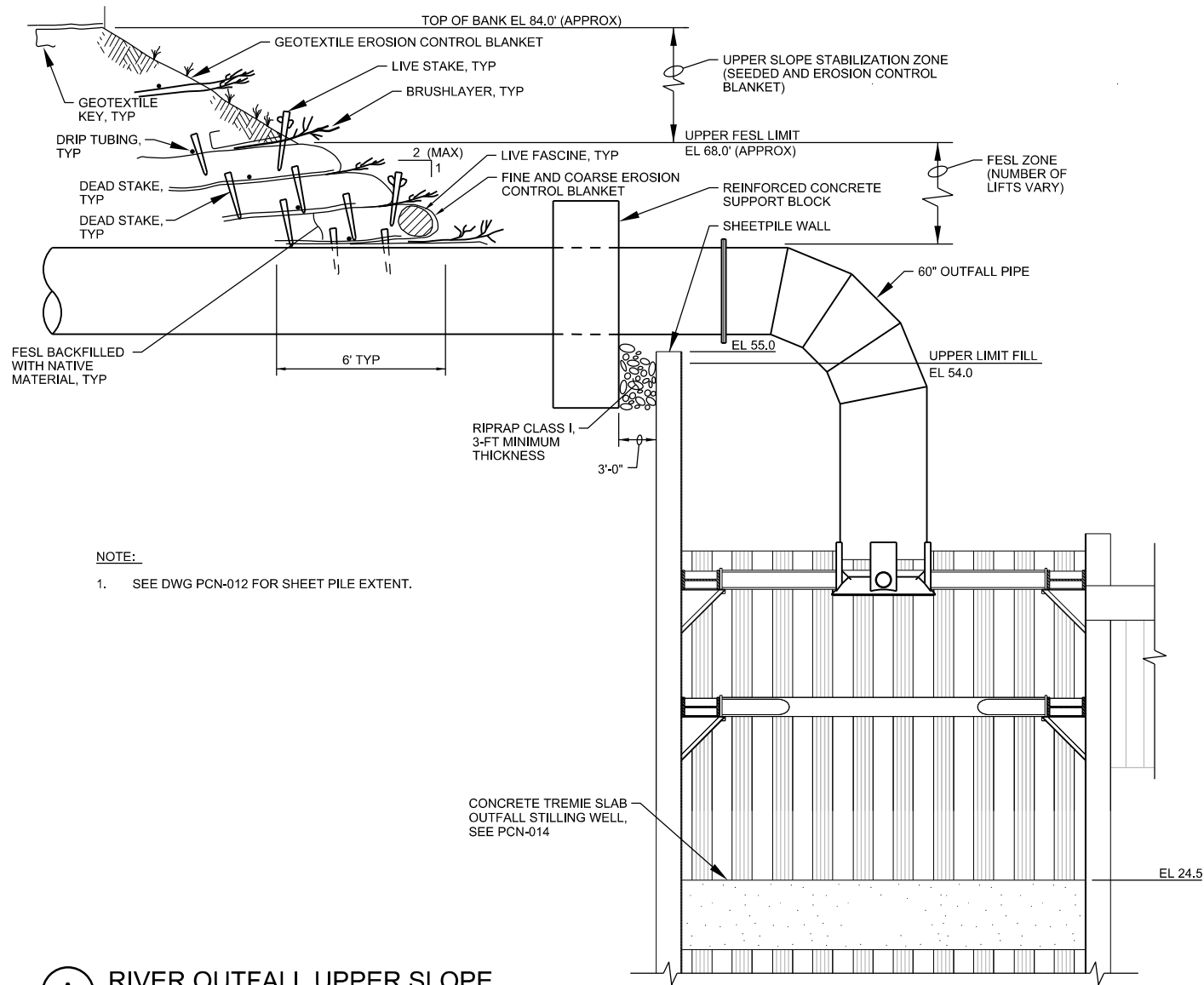


**B** **SECTION**  
 1/8" = 1'-0"

RIVER OUTFALL  
 DISCHARGE STRUCTURE PLANS  
 AND SECTION

PCN-014



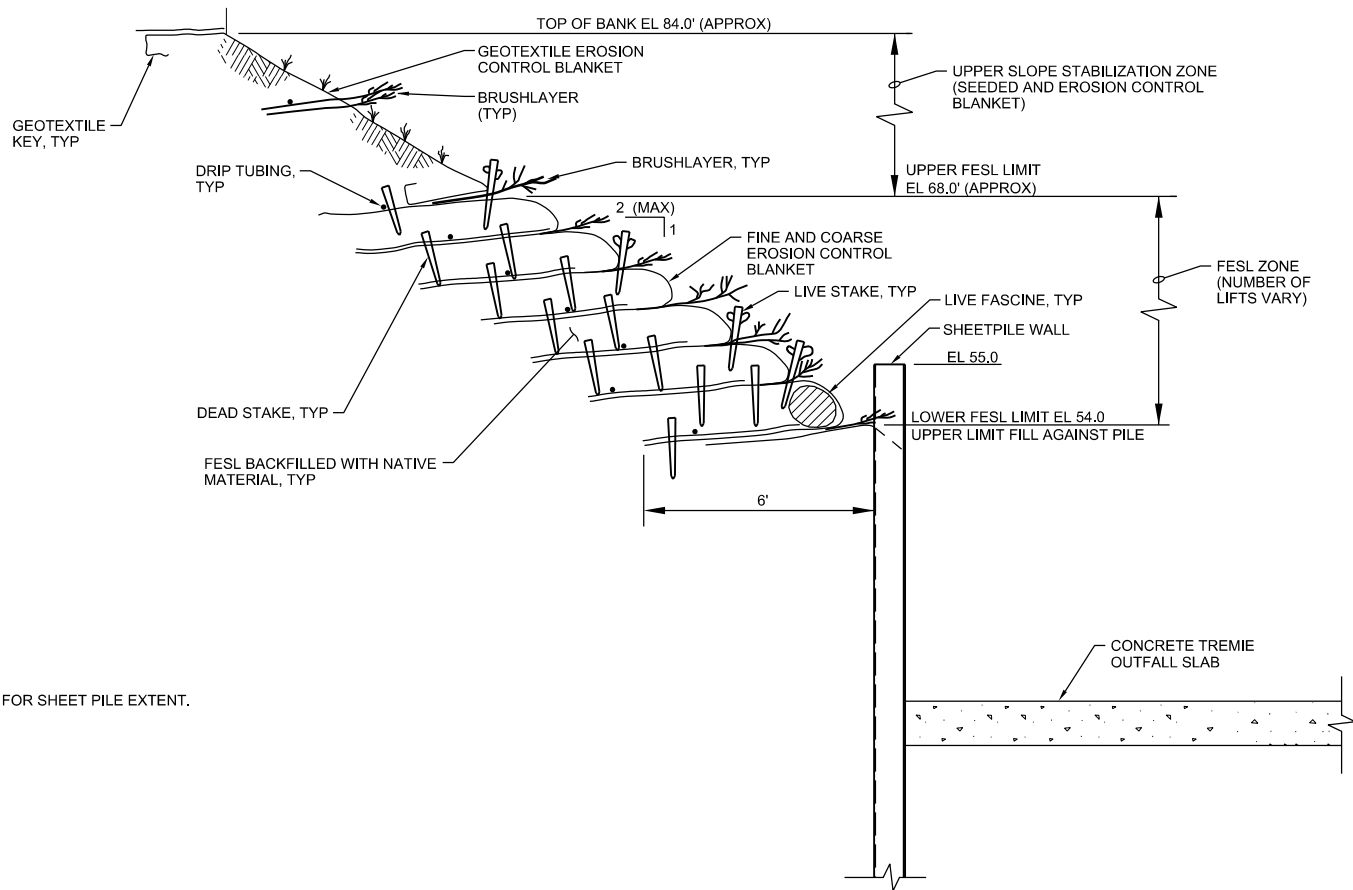


**A** RIVER OUTFALL UPPER SLOPE  
STABILIZATION AND FESL  
TYPICAL SECTION  
PCN-012  
NTS

RIVER OUTFALL UPPER  
SLOPE STABILIZATION AND FESL  
DETAIL

PCN-015

**CH2MHILL**



**NOTE:**

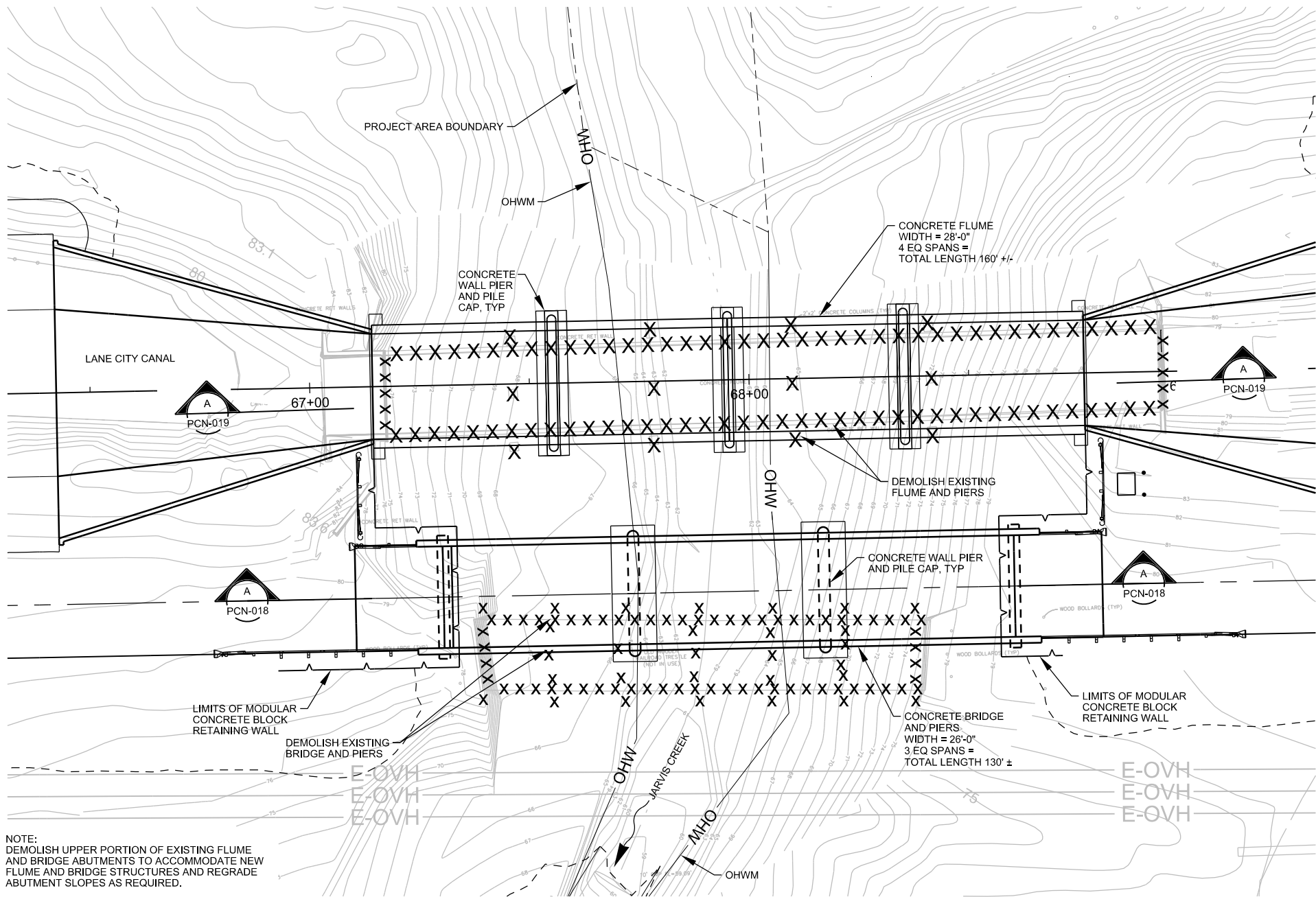
1. SEE PCN-012 FOR SHEET PILE EXTENT.

**A** RIVER OUTFALL UPPER SLOPE  
STABILIZATION AND FESL  
TYPICAL SECTION  
PCN-012  
NTS

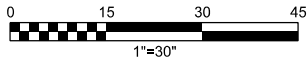
RIVER OUTFALL TREMIE  
SLAB AND SHEETPILE  
SECTION

PCN-016

**CH2MHILL**



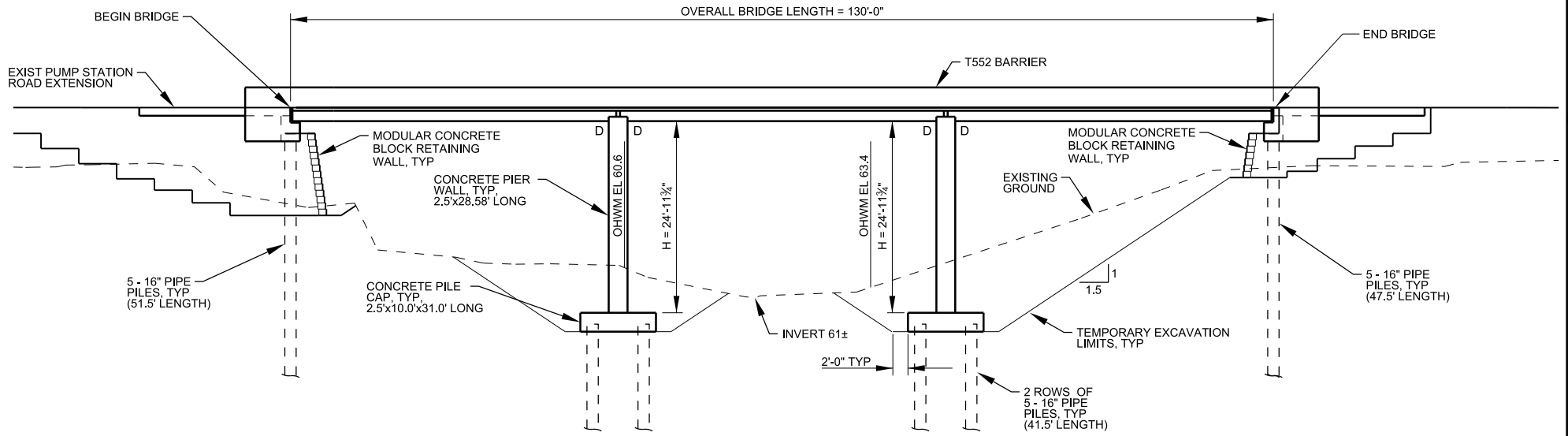
NOTE:  
 DEMOLISH UPPER PORTION OF EXISTING FLUME  
 AND BRIDGE ABUTMENTS TO ACCOMMODATE NEW  
 FLUME AND BRIDGE STRUCTURES AND REGRADE  
 ABUTMENT SLOPES AS REQUIRED.



PUMP STATION ROAD  
 JARVIS CREEK BRIDGE  
 AND CANAL FLUME PLAN

PCN-017

**CH2MHILL**



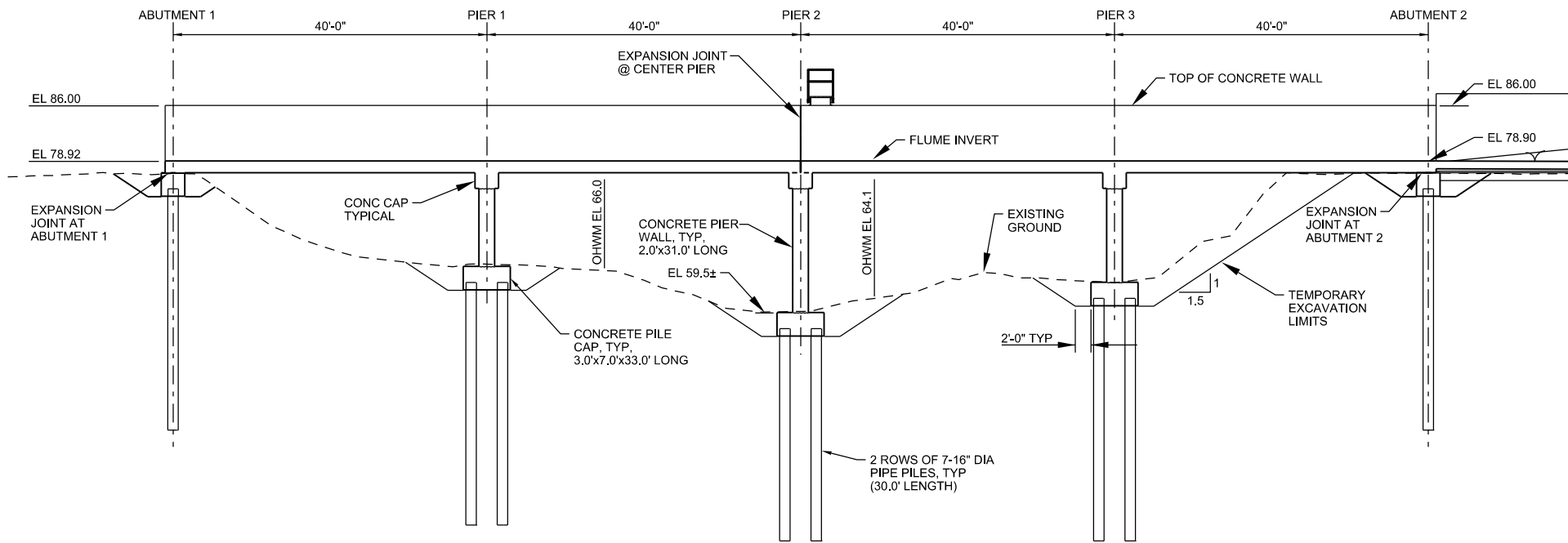
**(A) SECTION**  
1"=20"

PUMP STATION ROAD  
JARVIS CREEK  
BRIDGE SECTION

PCN-018

**CH2MHILL**



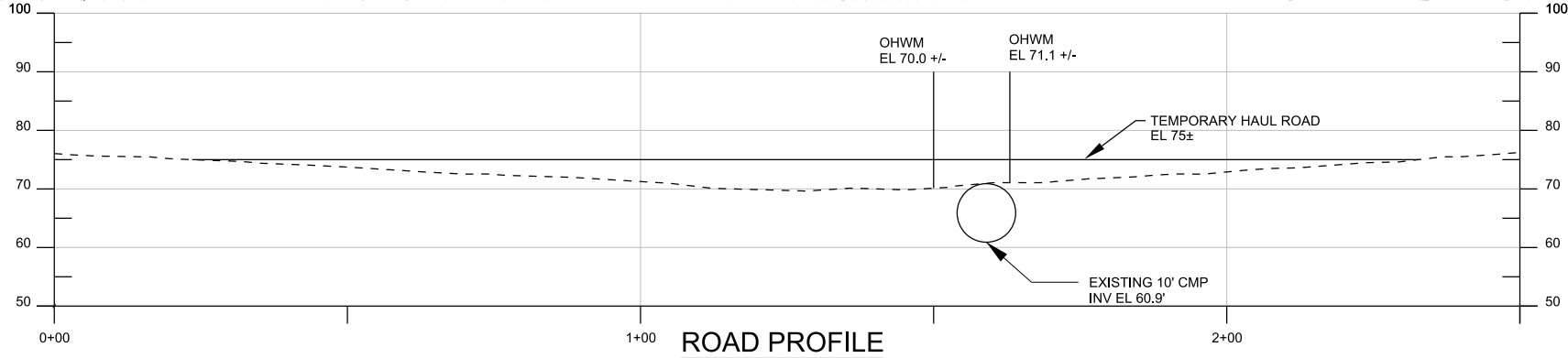
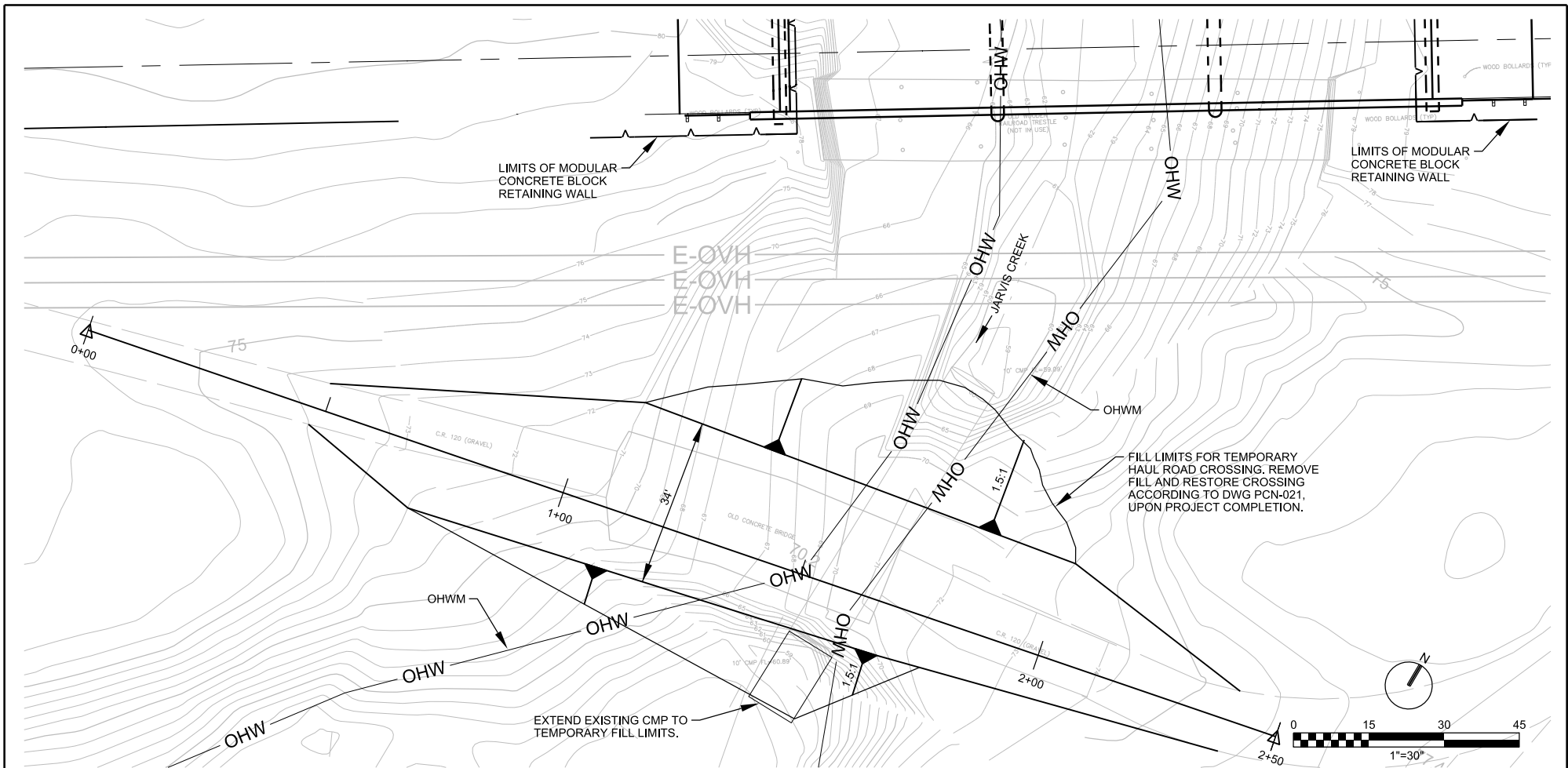


**A** SECTION  
 1"=20'-0"

LANE CITY CANAL  
 FLUME SECTION

PCN-019

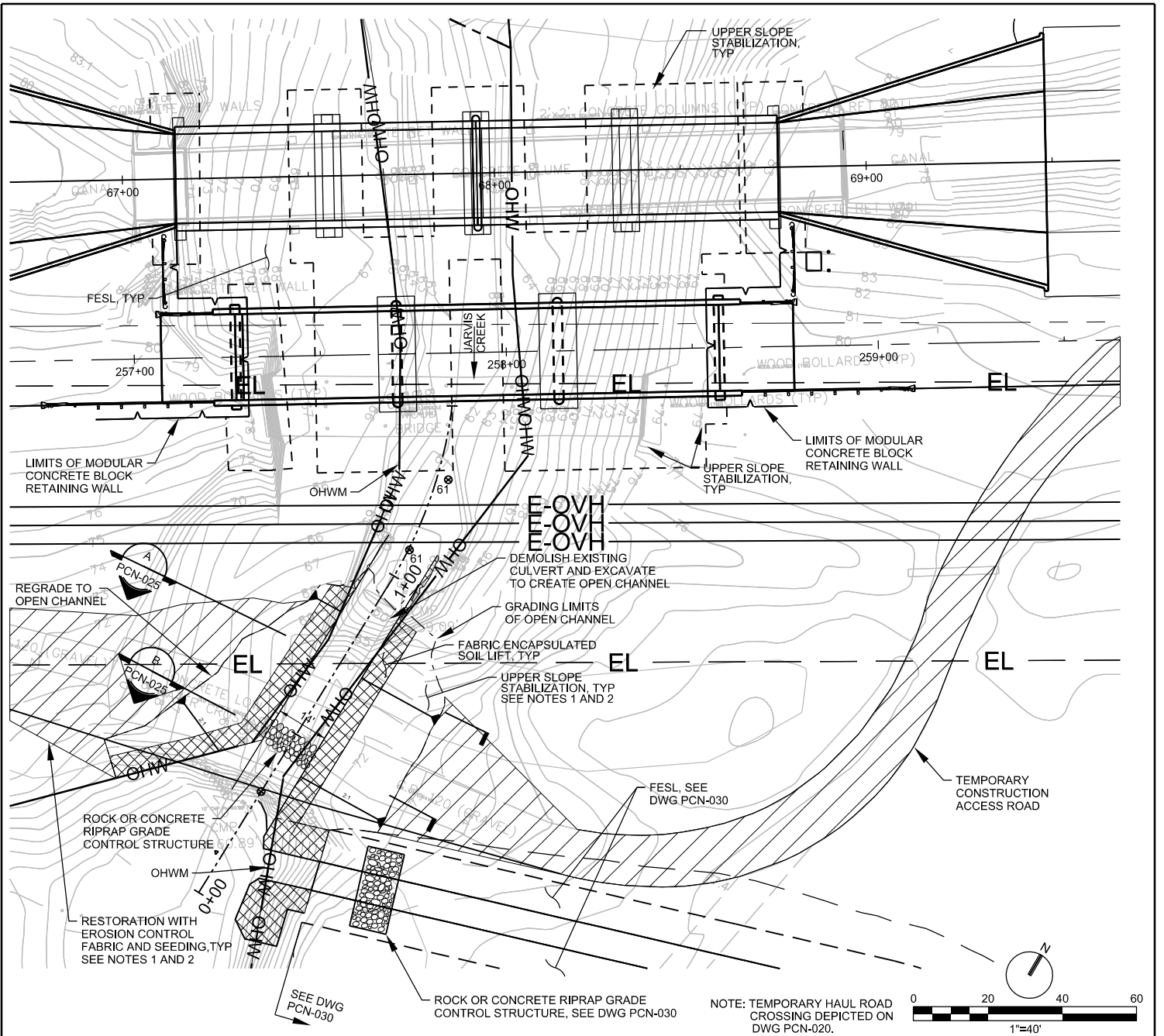




**PUMP STATION ROAD**  
**JARVIS CREEK TEMPORARY HAUL ROAD**  
**CROSSING PLAN AND SECTION**

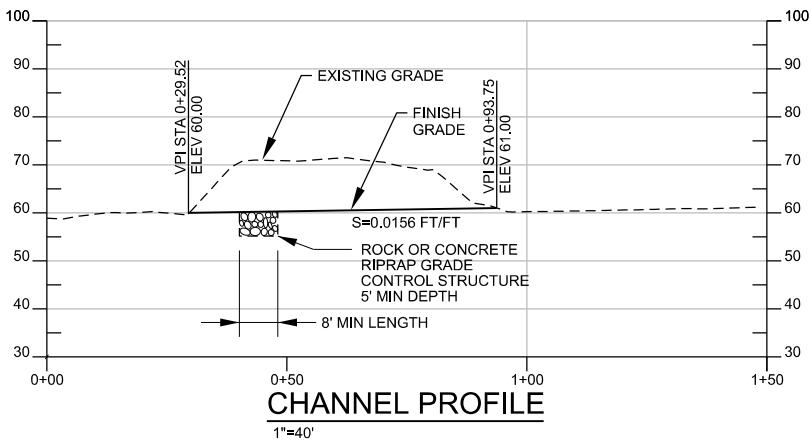
PCN-020





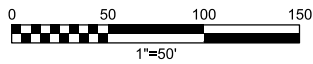
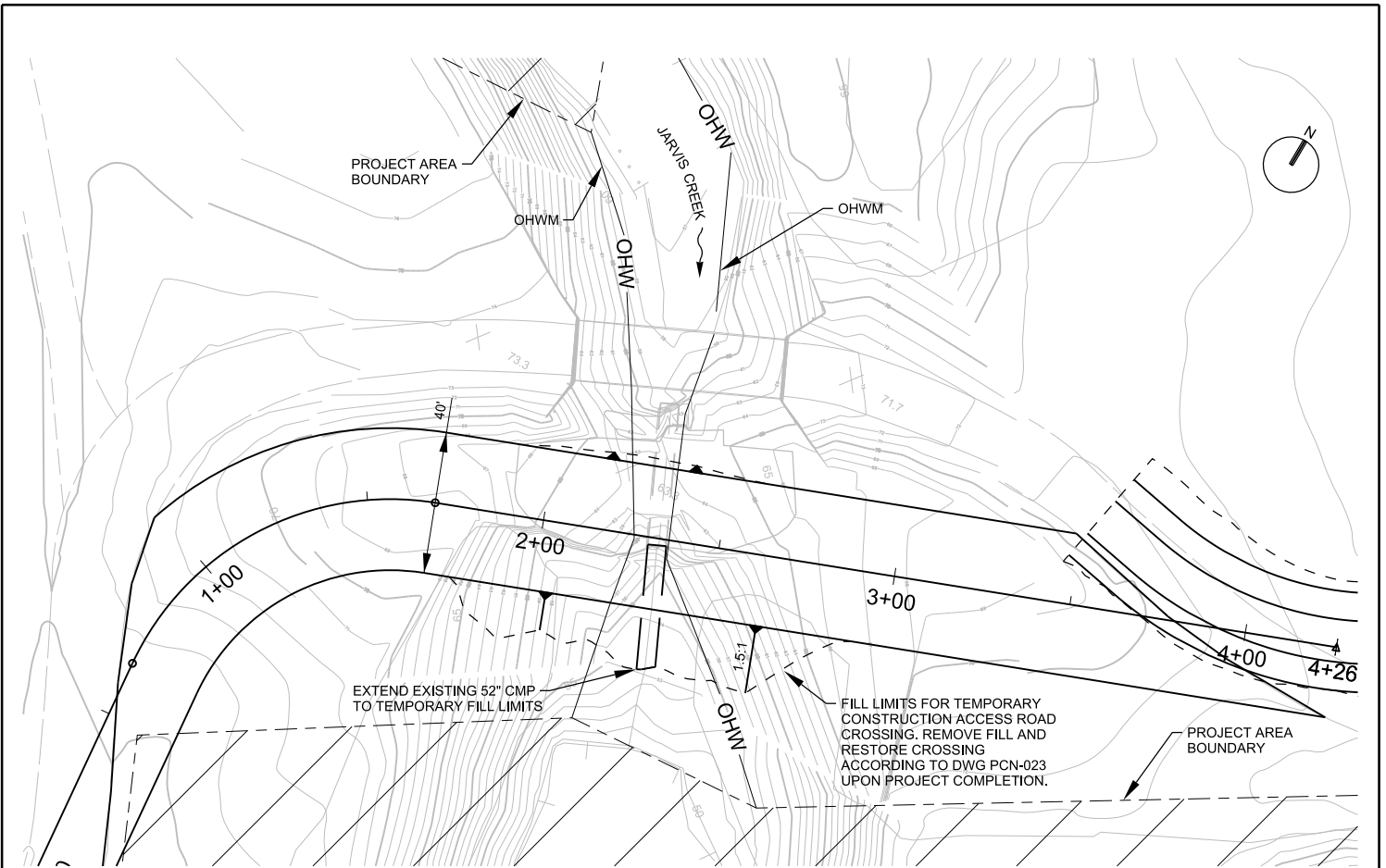
NOTE: TEMPORARY HAUL ROAD CROSSING DEPICTED ON DWG PCN-020.

- NOTES:**
1. SURFACE RESTORATION IS REQUIRED FOR ALL CONSTRUCTION ACTIVITIES RESULTING IN GROUND DISTURBANCE WITHIN THE VICINITY OF THE JARVIS CREEK BANK SLOPE. THIS MAY INCLUDE TRENCHING, TEMPORARY ACCESS ROAD CONSTRUCTION, MATERIAL AND EQUIPMENT STAGING. ALL AREAS WILL BE RESTORED TO EXISTING GRADE, SEEDED, AND STABILIZED USING EROSION CONTROL FABRIC UNLESS NOTED OTHERWISE.
  2. SURFACE RESTORATION SHALL MEET THE FOLLOWING REQUIREMENTS:  
 -FOR SLOPES FLATTER THAN 4H:1V OR ABOVE TOP OF BANK OR MORE THAN 50' AWAY FROM TOP OF CREEK BANK, RESTORATION SHALL INCLUDE EROSION CONTROL BLANKET AND SEEDING.  
 -FOR SLOPES BETWEEN 4H:1V AND 2.5:1V, RESTORATION SHALL INCLUDE BRUSHLAYERS AND EROSION CONTROL FABRIC.  
 -FOR SLOPES STEEPER THAN 2.5H:1V OR BELOW AN ELEVATION CORRESPONDING TO 5 FT ABOVE CHANNEL INVERT, RESTORATION SHALL CONSIST OF FESL.
  3. NO DISTURBANCE OR SURFACE RESTORATION IS ALLOWED BELOW THE OHWM, EXCEPT FOR PERMANENT FACILITIES INDICATED.



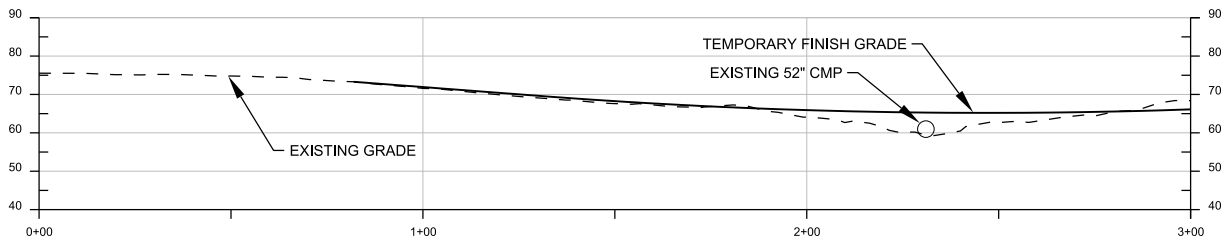
LANE CITY CANAL FLUME AND PUMP STATION ROAD  
 JARVIS CREEK CROSSING AND STORMWATER OUTFALL  
 TO JARVIS CREEK RESTORATION SITE PLAN

PCN-021



**NOTES:**

1. APPROXIMATE OHWM PROVIDED BY CLIENT.



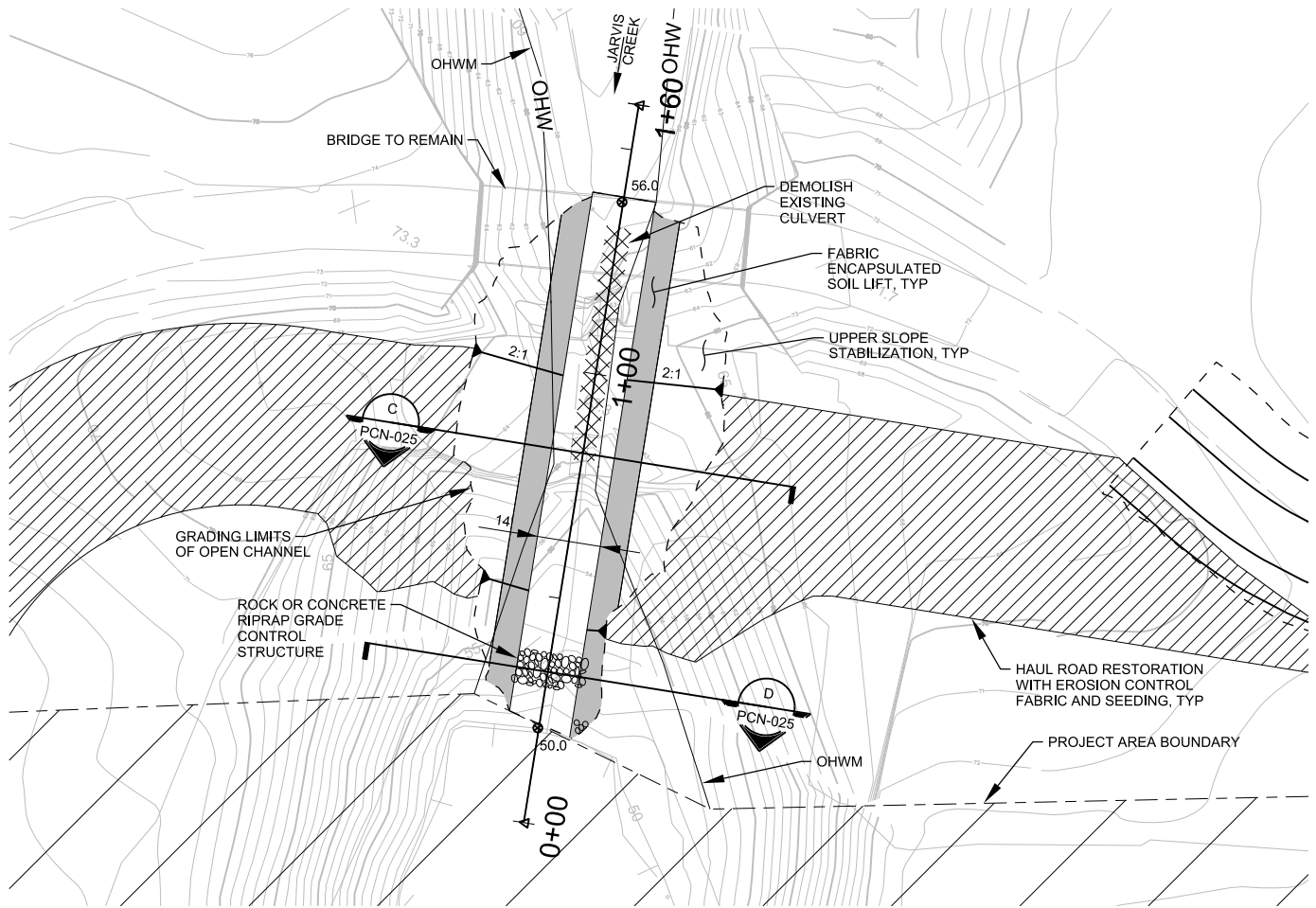
**ROAD PROFILE**

1"=50'

MCGOWAN ROAD  
 JARVIS CREEK TEMPORARY  
 HAUL ROAD CROSSING  
 PLAN AND SECTION

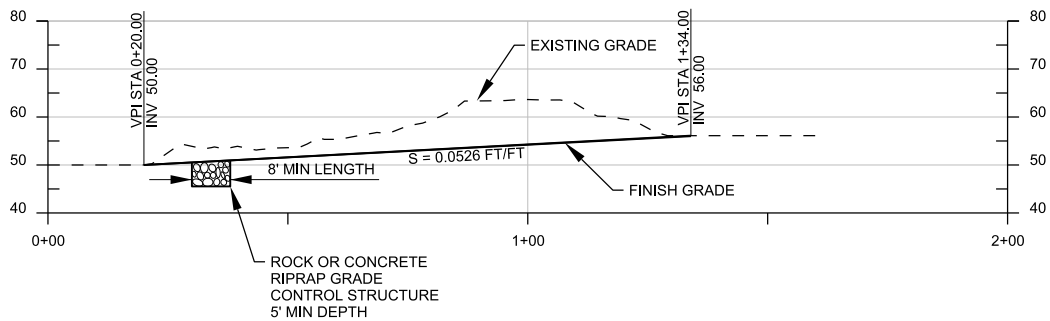
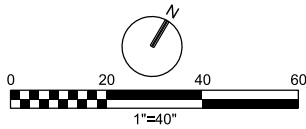
PCN-022

**CH2MHILL**



**NOTES:**

1. SURFACE RESTORATION IS REQUIRED FOR ALL CONSTRUCTION ACTIVITIES RESULTING IN GROUND DISTURBANCE WITHIN THE VICINITY OF THE JARVIS CREEK BANK SLOPE. THIS MAY INCLUDE TRENCHING, TEMPORARY ACCESS ROAD CONSTRUCTION, MATERIAL AND EQUIPMENT STAGING. ALL AREAS WILL BE RESTORED TO EXISTING GRADE, SEEDED, AND STABILIZED USING EROSION CONTROL FABRIC UNLESS NOTED OTHERWISE.
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 -FOR SLOPES BETWEEN 4H:1V AND 2.5:1V, RESTORATION SHALL INCLUDE BRUSHLAYERS AND EROSION CONTROL FABRIC.  
 -FOR SLOPES STEEPER THAN 2.5H:1V OR BELOW AN ELEVATION CORRESPONDING TO 5 FT ABOVE CHANNEL INVERT, RESTORATION SHALL CONSIST OF FESL.
3. TEMPORARY CONSTRUCTION ACCESS ROAD CROSSING DEPICTED IN DWG PCN-022.
4. APPROXIMATE OHWM PROVIDED BY CLIENT.



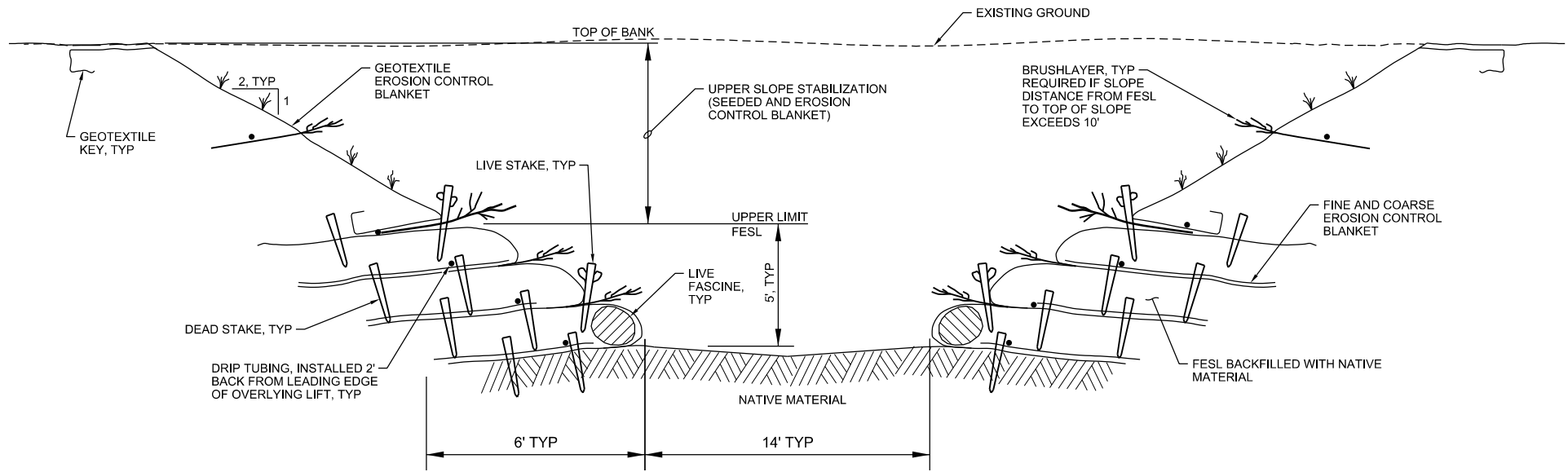
**CHANNEL PROFILE**

1"=40'

**MCGOWAN ROAD  
JARVIS CREEK CROSSING  
RESTORATION SITE PLAN**

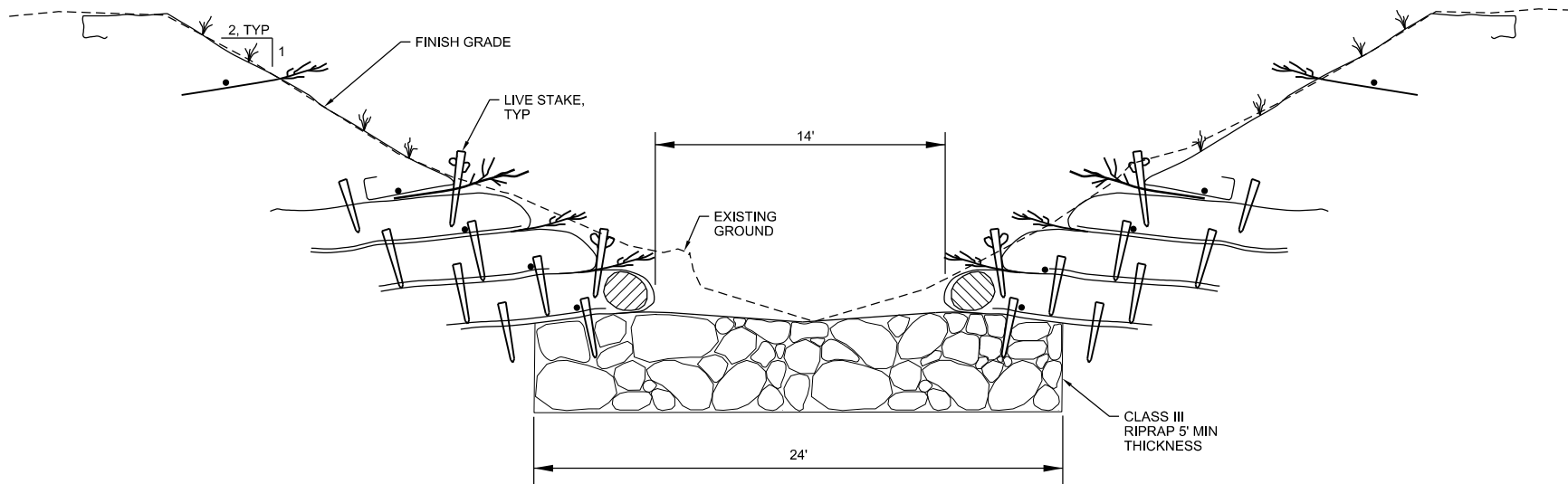
PCN-023





**JARVIS CREEK RESTORATION SECTION @ PUMP STATION ROAD**

NTS



**JARVIS CREEK ROCK GRADE CONTROL STRUCTURE SECTION @ PUMP STATION ROAD**

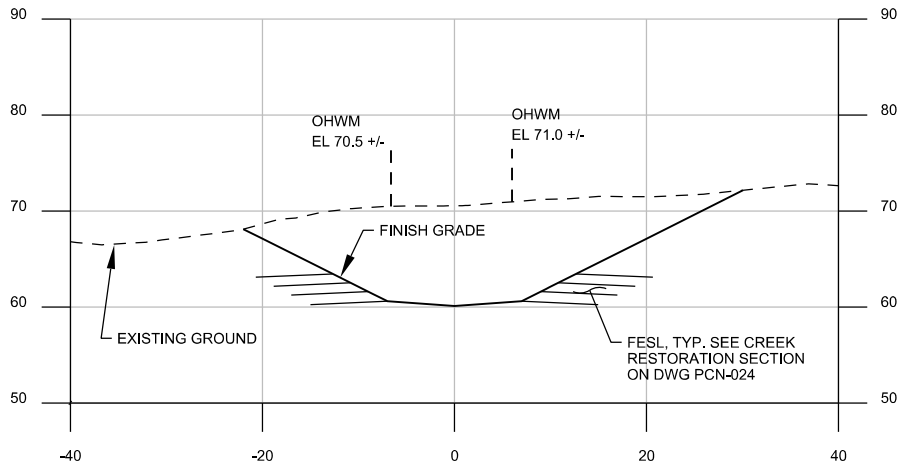
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**TYPICAL JARVIS CREEK RESTORATION SECTIONS**

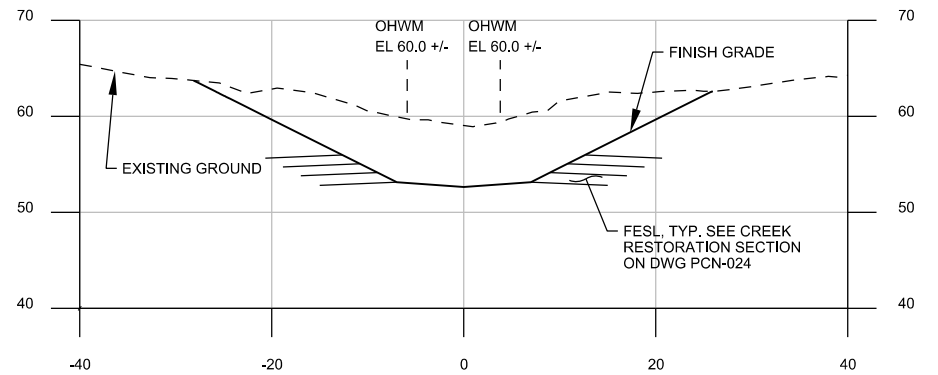
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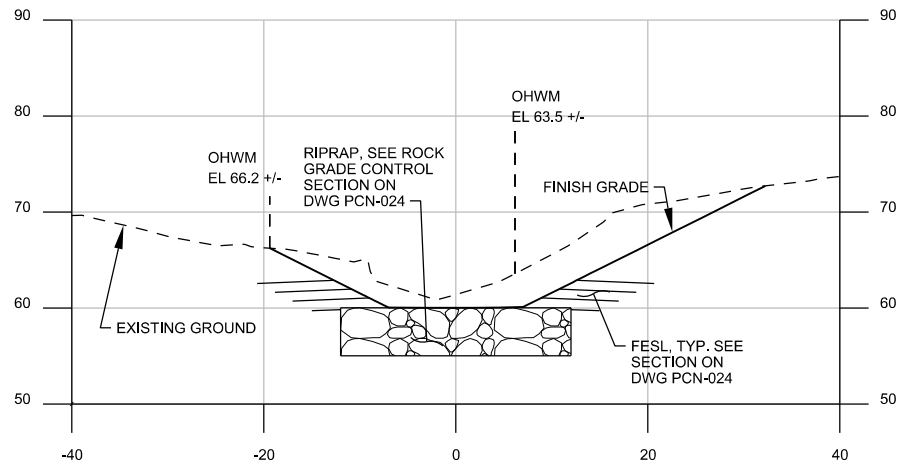




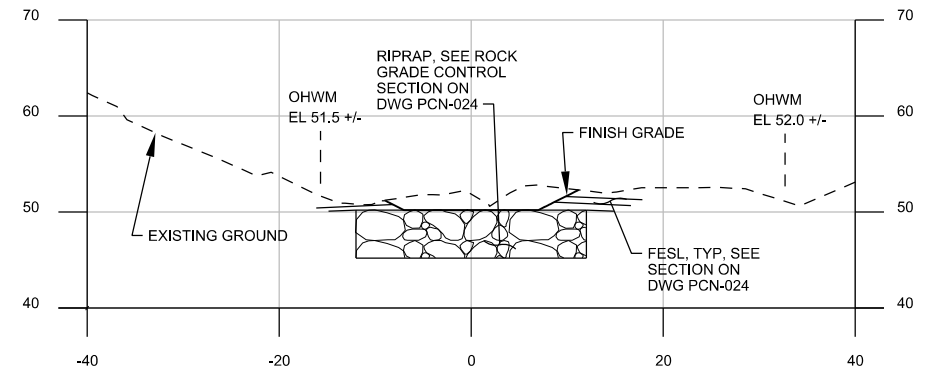
**A** SECTION  
1"=20'  
PCN-021



**C** SECTION  
1"=20'  
PCN-023



**B** SECTION  
1"=20'  
PCN-021

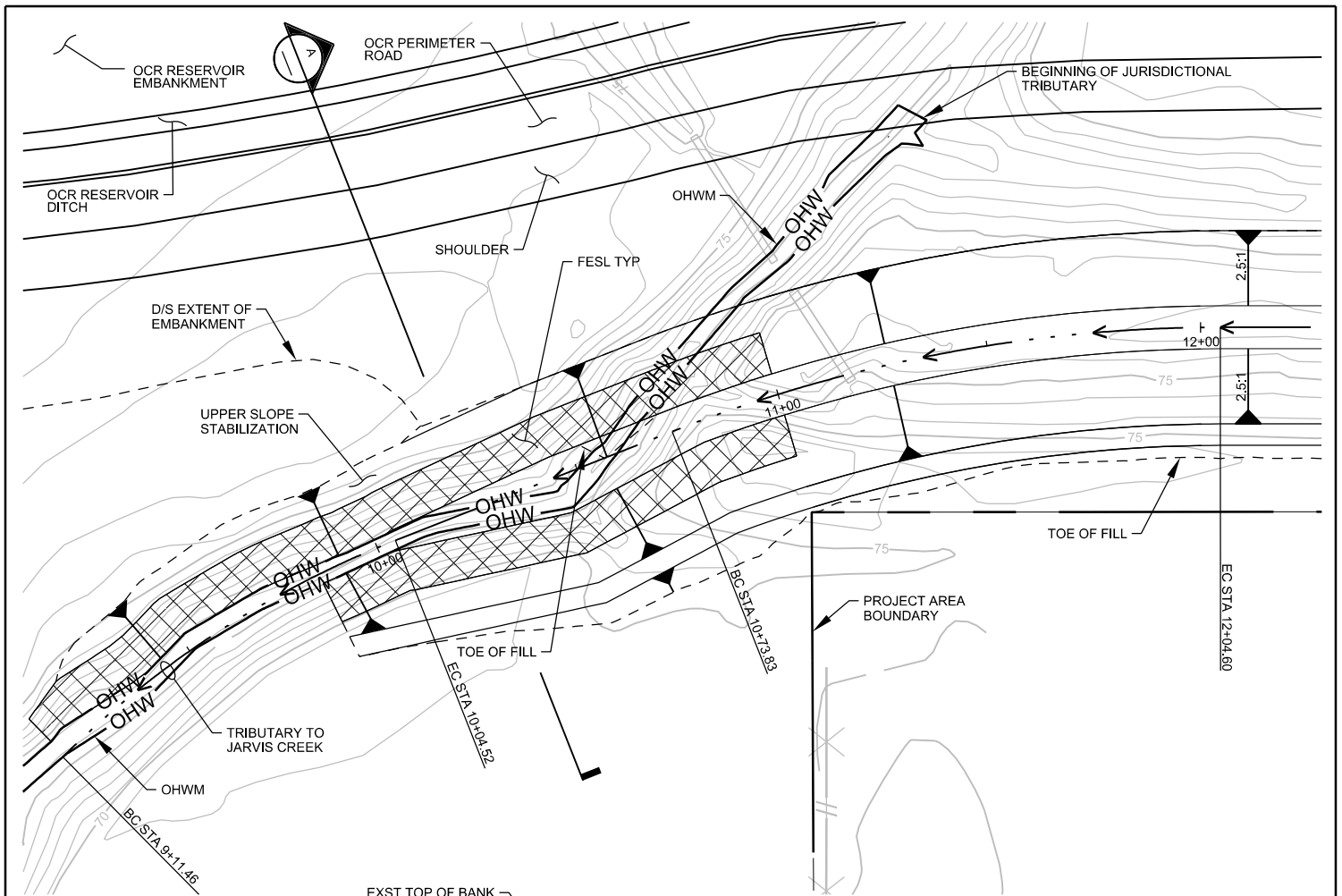


**D** SECTION  
1"=20'  
PCN-023

PUMP STATION ROAD AND MCGOWAN ROAD  
JARVIS CREEK RESTORATION  
SECTIONS

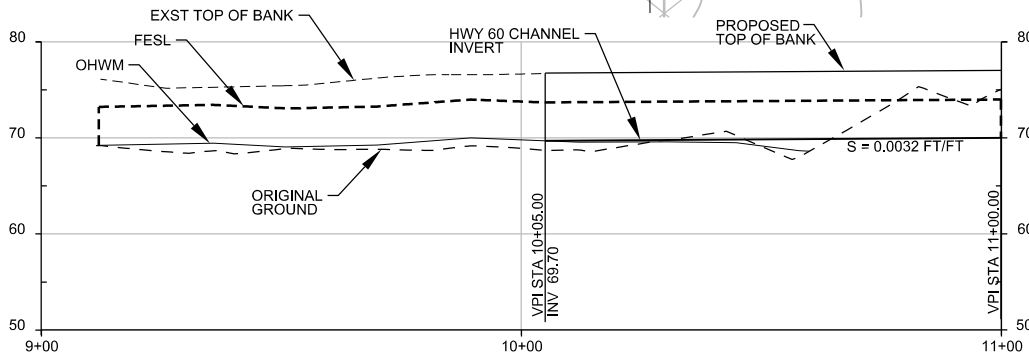
PCN-025



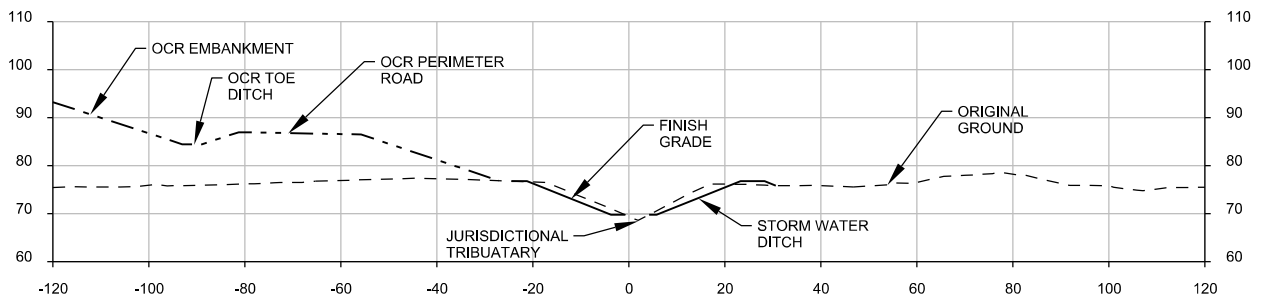


**NOTES:**

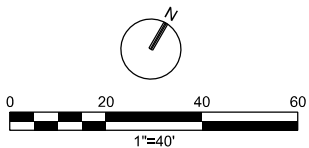
- 1. OHWM APPROXIMATED.



**STORM WATER DITCH PROFILE**



**SECTION A**  
1"=40'



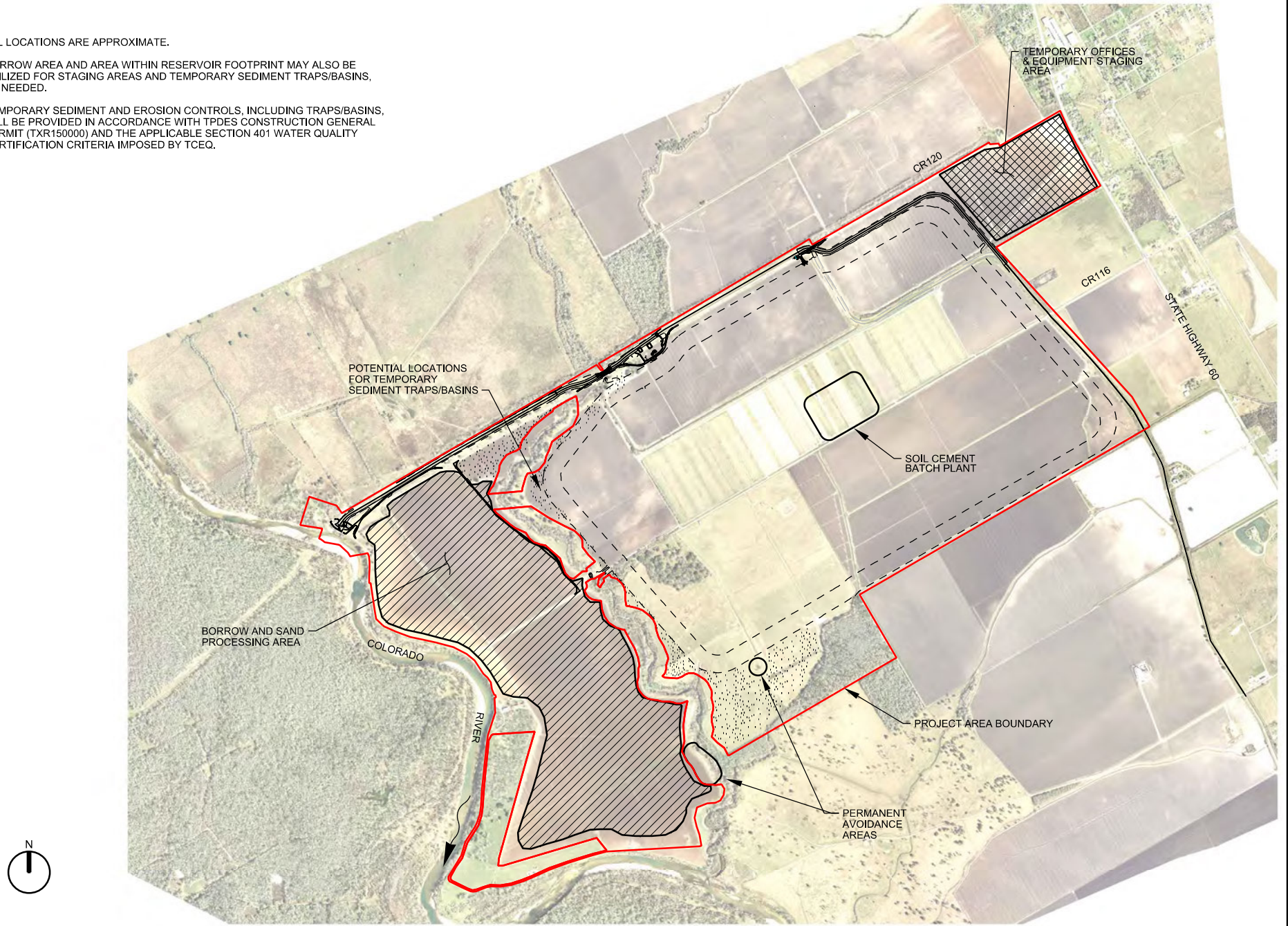
**PERIMETER ROAD, EMBANKMENT  
AND STORM WATER DITCH OUTFALL TO  
UNNAMED TRIBUTARY TO JARVIS CREEK**

PCN-026



**NOTES:**

1. ALL LOCATIONS ARE APPROXIMATE.
2. BORROW AREA AND AREA WITHIN RESERVOIR FOOTPRINT MAY ALSO BE UTILIZED FOR STAGING AREAS AND TEMPORARY SEDIMENT TRAPS/BASINS, AS NEEDED.
3. TEMPORARY SEDIMENT AND EROSION CONTROLS, INCLUDING TRAPS/BASINS, WILL BE PROVIDED IN ACCORDANCE WITH TPDES CONSTRUCTION GENERAL PERMIT (TXR150000) AND THE APPLICABLE SECTION 401 WATER QUALITY CERTIFICATION CRITERIA IMPOSED BY TCEQ.



**GENERAL  
CONSTRUCTION  
SITE LAYOUT**

PCN-027

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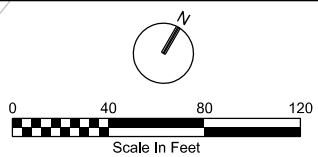
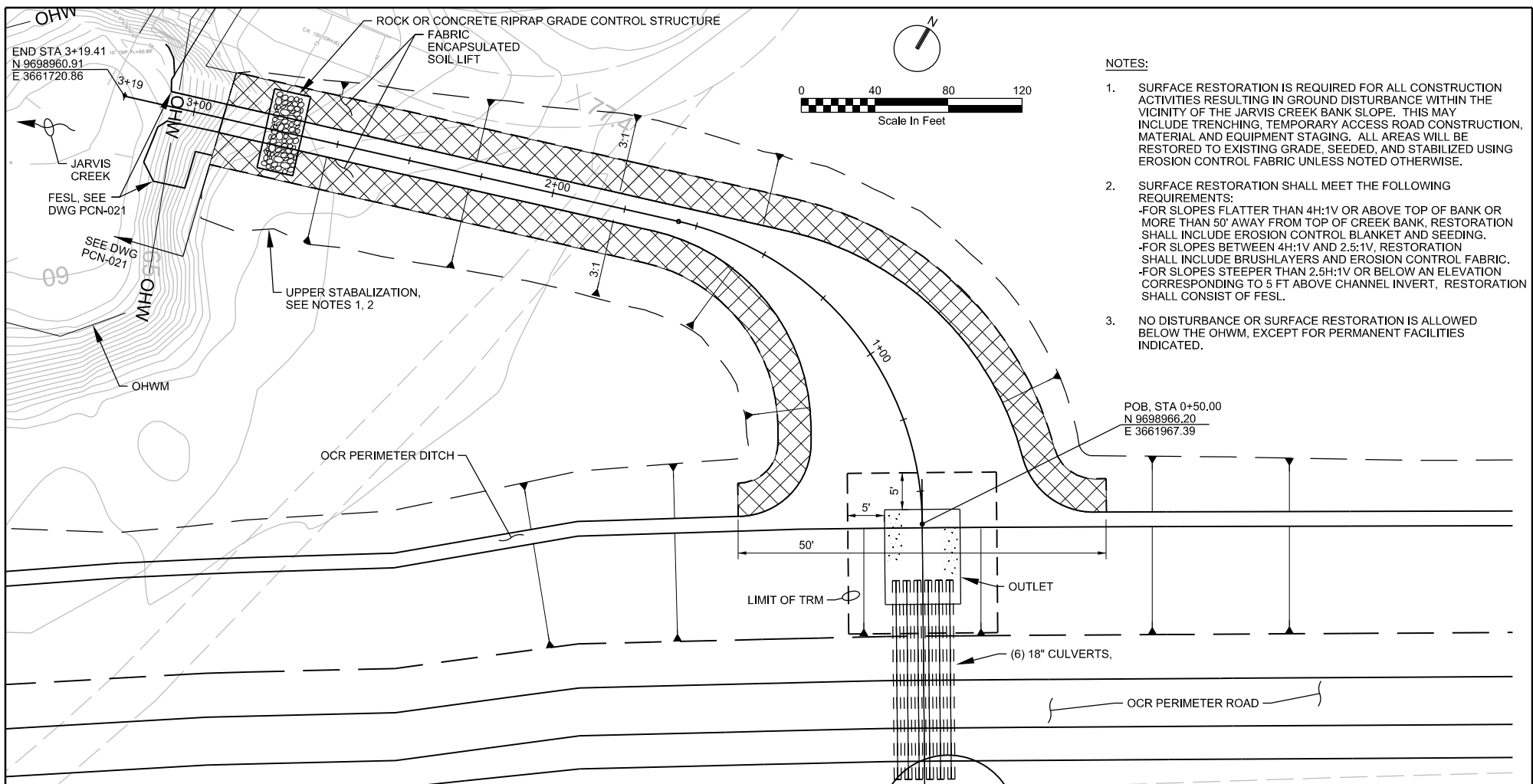
PCN-028

**CH2MHILL**<sup>®</sup>

RESERVED

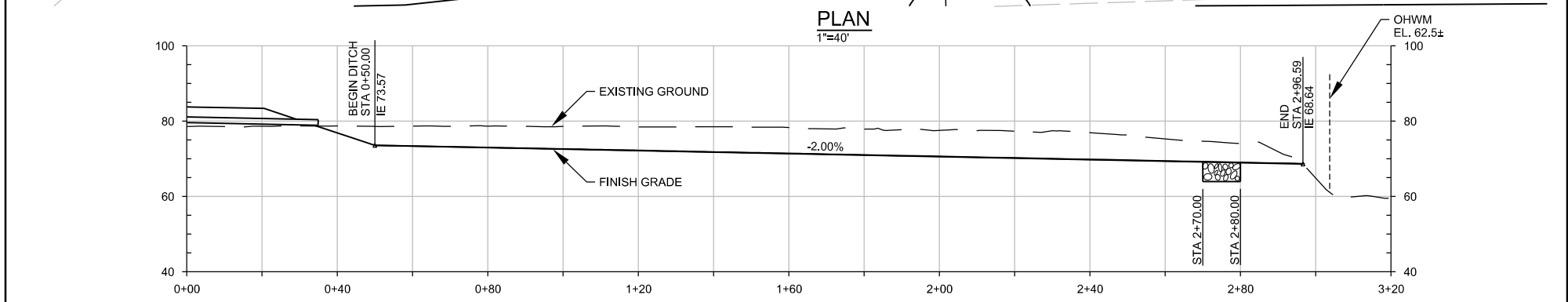
PCN-029

**CH2MHILL**<sup>®</sup>



**NOTES:**

1. SURFACE RESTORATION IS REQUIRED FOR ALL CONSTRUCTION ACTIVITIES RESULTING IN GROUND DISTURBANCE WITHIN THE VICINITY OF THE JARVIS CREEK BANK SLOPE. THIS MAY INCLUDE TRENCHING, TEMPORARY ACCESS ROAD CONSTRUCTION, MATERIAL AND EQUIPMENT STAGING. ALL AREAS WILL BE RESTORED TO EXISTING GRADE, SEEDED, AND STABILIZED USING EROSION CONTROL FABRIC UNLESS NOTED OTHERWISE.
2. SURFACE RESTORATION SHALL MEET THE FOLLOWING REQUIREMENTS:
  - FOR SLOPES FLATTER THAN 4H:1V OR ABOVE TOP OF BANK OR MORE THAN 50' AWAY FROM TOP OF CREEK BANK, RESTORATION SHALL INCLUDE EROSION CONTROL BLANKET AND SEEDING.
  - FOR SLOPES BETWEEN 4H:1V AND 2.5:1V, RESTORATION SHALL INCLUDE BRUSHLAYERS AND EROSION CONTROL FABRIC.
  - FOR SLOPES STEEPER THAN 2.5H:1V OR BELOW AN ELEVATION CORRESPONDING TO 5 FT ABOVE CHANNEL INVERT, RESTORATION SHALL CONSIST OF FESL.
3. NO DISTURBANCE OR SURFACE RESTORATION IS ALLOWED BELOW THE OHWM, EXCEPT FOR PERMANENT FACILITIES INDICATED.



**OFF CHANNEL RESERVOIR STORMWATER  
OUTFALL TO JARVIS CREEK PLAN AND PROFILE**

PCN-030





**B. January 29, 2014 Figures Annotated with Revisions**



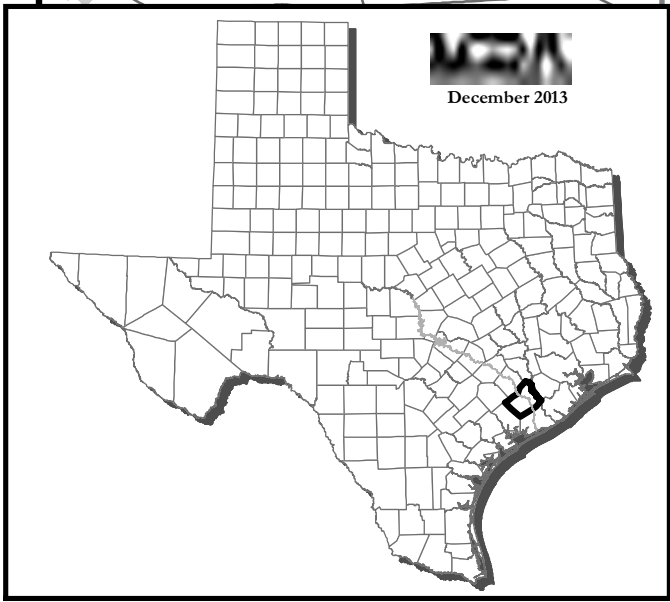
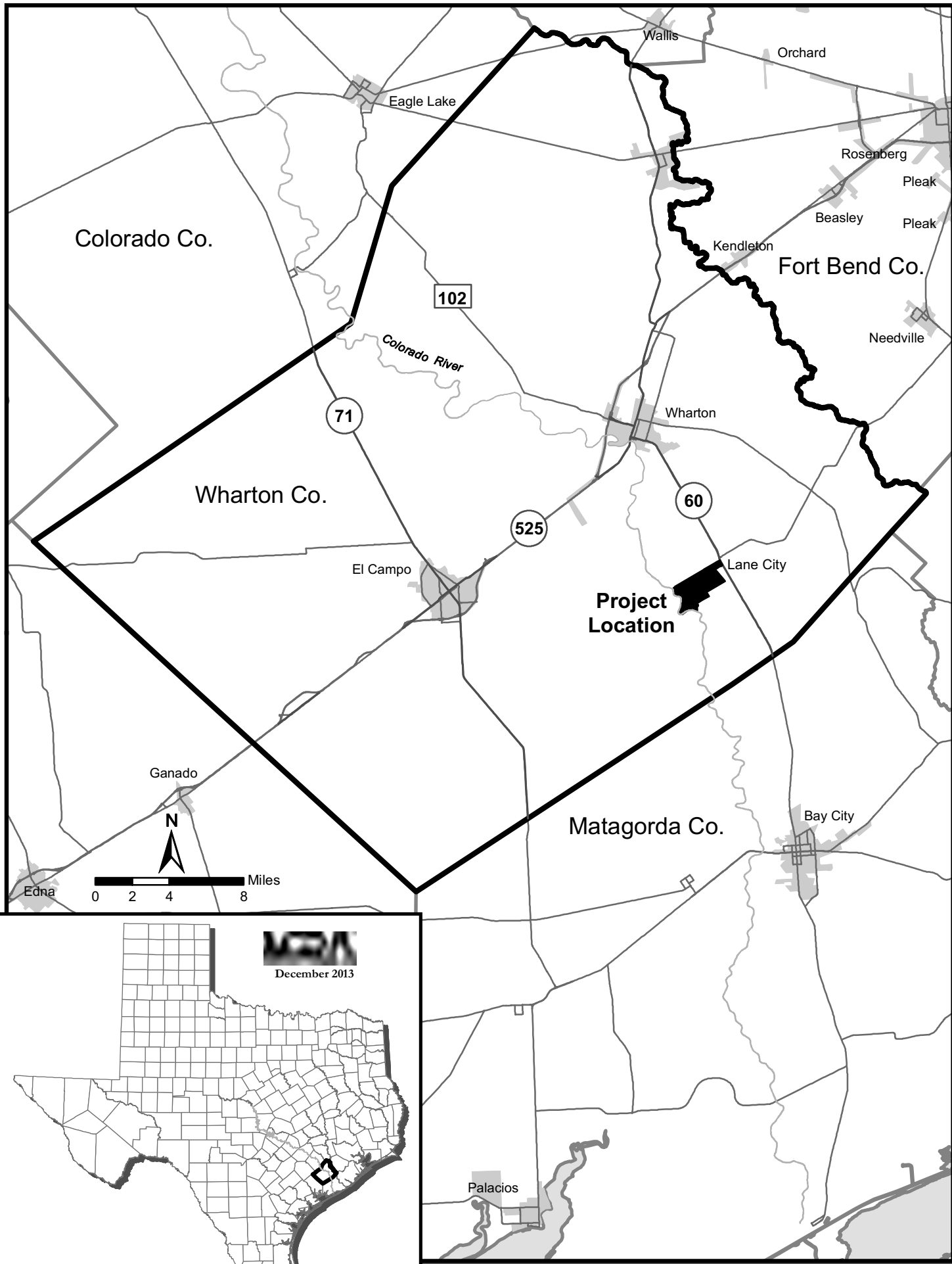
*Mary P. Mayfield*  
*4-6-15*

The figures issued by CH2MHill on January 8, 2014 and bearing the Professional Engineer's seal of Ken C. Hall, P.E. have been modified with CH2MHill's permission solely to include annotations in text boxes describing design and drawing revisions that have been incorporated into the revised figures provided in Attachment 1.A. of this submittal.

This document is released for permitting purposes only, under the authority of Mary P. Mayfield, P.E. No. 107538 on April 6, 2015. This document is not intended for bidding, construction, or other purposes.

## LIST OF FIGURES

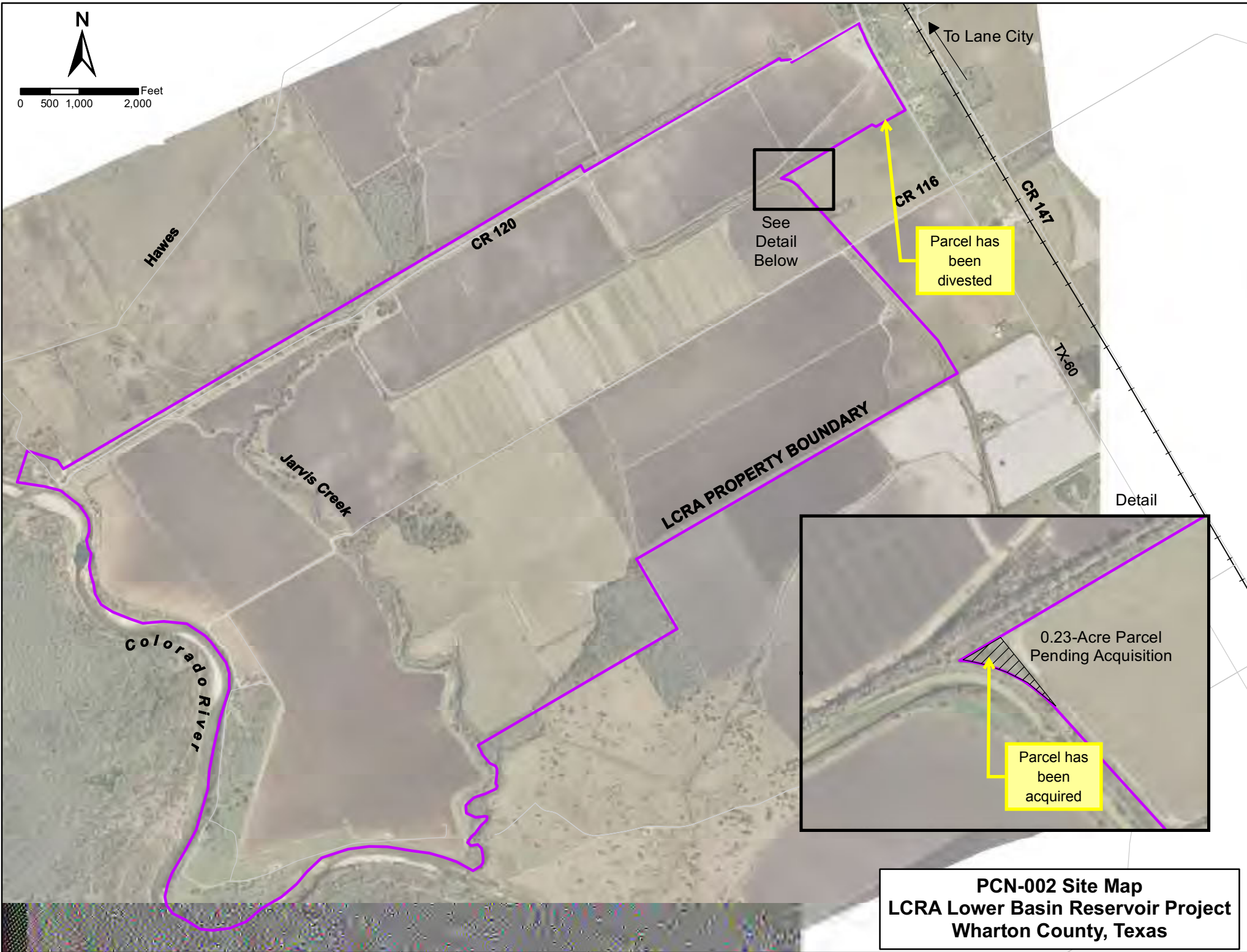
PCN-001	PROJECT LOCATION (No Revision)
PCN-002	SITE MAP (Revised)
PCN-003	PROJECT AREA MAP (Revised)
PCN-004	GENERAL OVERALL SITE AND ACCESS PLAN (Revised)
PCN-005	GENERAL SITE PLAN -- RIVER INTAKE AND OUTFALL (Revised)
PCN-006	HORIZONTAL PUMP STATION REPLACEMENT OF SUCTION PIPING PLAN (Revised)
PCN-007	HORIZONTAL PUMP STATION REPLACEMENT OF SUCTION PIPING SECTION (Revised)
PCN-008	HORIZONTAL PUMP STATION UPPER SLOPE STABILIZATION AND FESL DETAILS (Deleted)
PCN-009	VERTICAL PUMP STATION SITE PLAN (Revised)
PCN-010	VERTICAL TURBINE PUMP STATION INTAKE TOWER REPAIR PLAN (No Revision)
PCN-011	VERTICAL TURBINE PUMP STATION INTAKE TOWER REPAIR SECTION (No Revision)
PCN-012	RIVER OUTFALL SITE PLAN (Revised)
PCN-013	RIVER OUTFALL PIPELINE PROFILE (Revised)
PCN-014	RIVER OUTFALL DISCHARGE STRUCTURE PLANS AND SECTION (Revised)
PCN-015	RIVER OUTFALL UPPER SLOPE STABILIZATION AND FESL DETAIL (Revised)
PCN-016	RIVER OUTFALL TREMIE SLAB AND SHEET PILE SECTION (Revised)
PCN-017	CR120 JARVIS CREEK BRIDGE AND CANAL FLUME PLAN (Revised)
PCN-018	CR120 JARVIS CREEK BRIDGE SECTION (Revised)
PCN-019	LANE CITY CANAL FLUME SECTION (Revised)
PCN-020	CR120 JARVIS CREEK TEMPORARY HAUL ROAD CROSSING PLAN AND SECTION (No Revision)
PCN-021	CR120 JARVIS CREEK CROSSING RESTORATION SITE PLAN (Revised)
PCN-022	CR116 JARVIS CREEK TEMPORARY HAUL ROAD CROSSING PLAN AND SECTION (No Revision)
PCN-023	CR116 JARVIS CREEK CROSSING RESTORATION SITE PLAN (Revised)
PCN-024	TYPICAL JARVIS CREEK RESTORATION SECTIONS (Revised)
PCN-025	CR120 AND CR116 JARVIS CREEK RESTORATION SECTIONS
PCN-026	PERIMETER ROAD, EMBANKMENT AND STORM WATER DITCH OUTFALL TO UNNAMED TRIBUTARY TO JARVIS CREEK (Revised)
PCN-027	GENERAL CONSTRUCTION SITE LAYOUT (Revised)
PCN-028	HORIZONTAL AND VERTICAL PUMP STATION TEMPORARY ACCESS RAMP GRADING (Deleted)
PCN-029	RIVER OUTFALL TEMPORARY ACCESS RAMP GRADING (Deleted)



**PCN-001 Project Location  
LCRA Lower Basin Reservoir Project  
Wharton County, Texas**

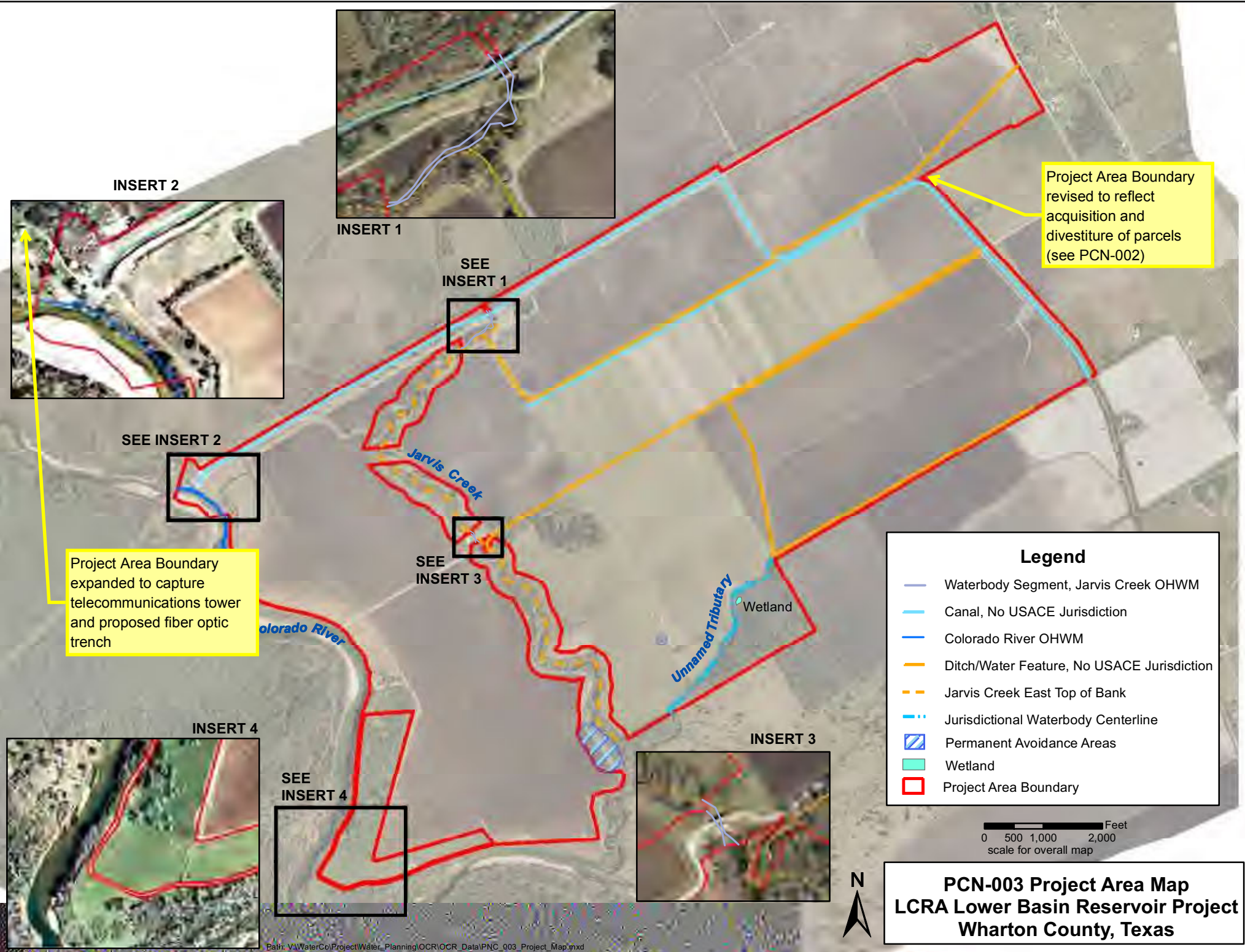


0 500 1,000 2,000 Feet



**PCN-002 Site Map  
LCRA Lower Basin Reservoir Project  
Wharton County, Texas**



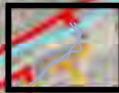


INSERT 2



INSERT 1

SEE  
INSERT 1



SEE INSERT 2



Project Area Boundary  
expanded to capture  
telecommunications tower  
and proposed fiber optic  
trench

SEE  
INSERT 3



Colorado River

Jarvis Creek

Unnamed Tributary

Wetland

INSERT 3



INSERT 4



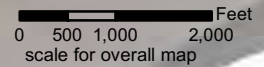
SEE  
INSERT 4



Project Area Boundary  
revised to reflect  
acquisition and  
divestiture of parcels  
(see PCN-002)

### Legend

- Waterbody Segment, Jarvis Creek OHWM
- Canal, No USACE Jurisdiction
- Colorado River OHWM
- Ditch/Water Feature, No USACE Jurisdiction
- - - Jarvis Creek East Top of Bank
- · - · - Jurisdictional Waterbody Centerline
- Permanent Avoidance Areas
- Wetland
- Project Area Boundary



**PCN-003 Project Area Map**  
**LCRA Lower Basin Reservoir Project**  
**Wharton County, Texas**

---

# Lower Basin Reservoir Project

## Engineering Drawings for PCN Application

Prepared for  
**Lower Colorado River Authority**

January 8, 2014



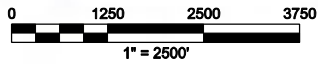
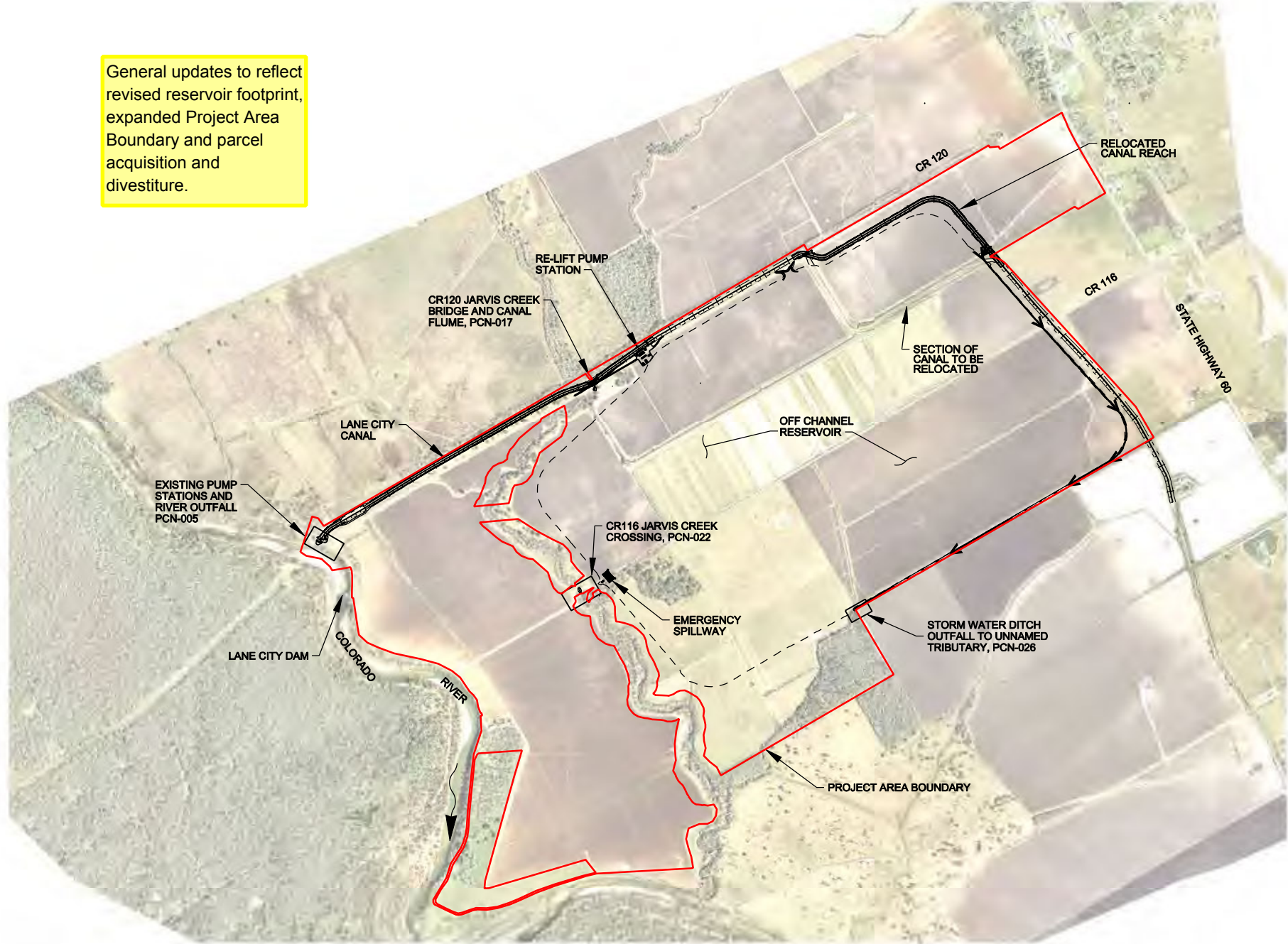
**CH2MHILL®**

TBPE Firm No. 3699  
12301 Research Blvd.  
Bldg. 4, Suite 250  
Austin, TX 78759

Not for construction. This document is released  
for permitting purposes only, under the authority of Ken C. Hall,  
P.E. No. 91376, on January 8, 2014.



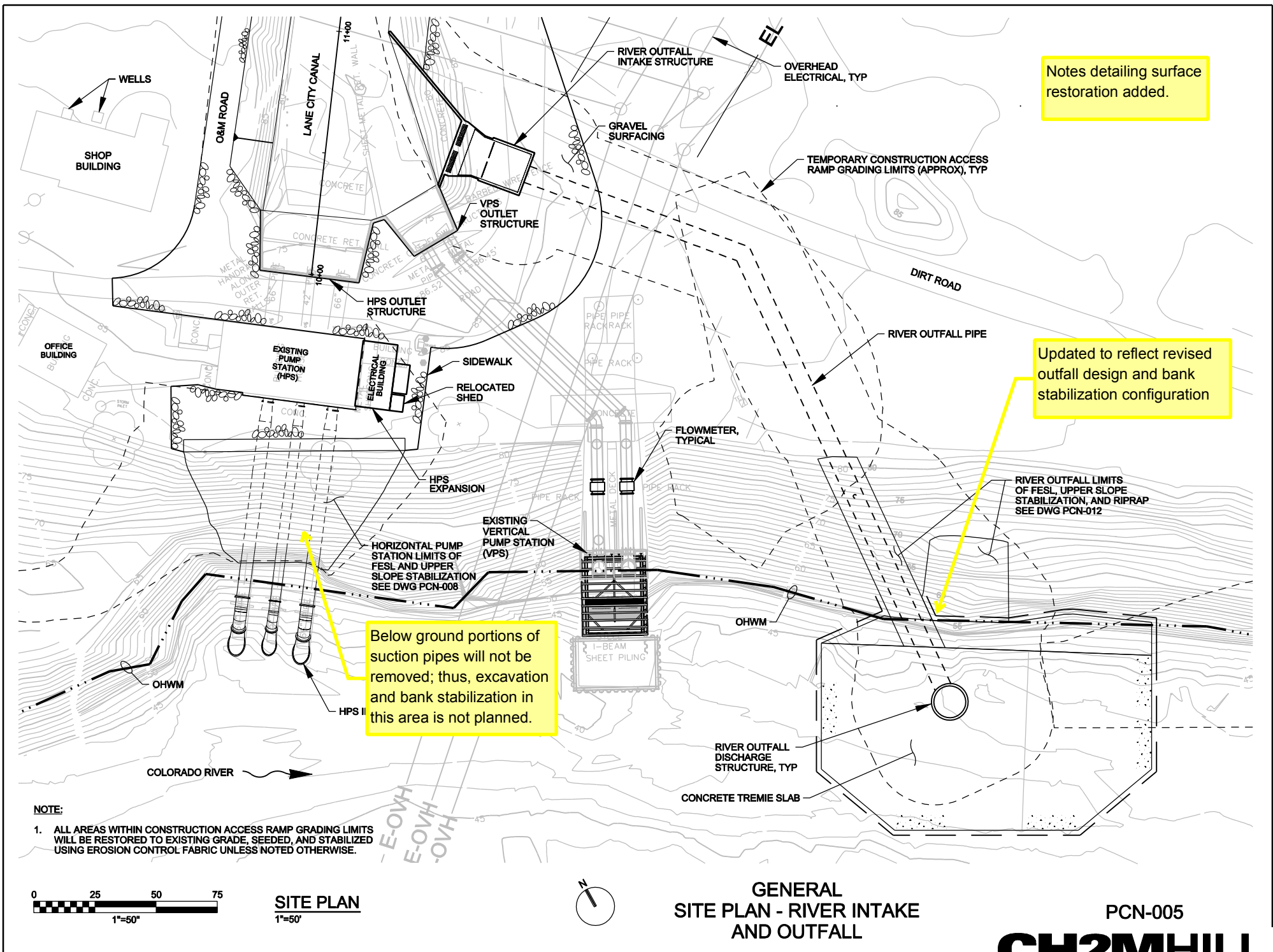
General updates to reflect revised reservoir footprint, expanded Project Area Boundary and parcel acquisition and divestiture.



**GENERAL  
OVERALL SITE  
AND ACCESS PLAN**

PCN-004





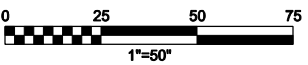
Notes detailing surface restoration added.

Updated to reflect revised outfall design and bank stabilization configuration

Below ground portions of suction pipes will not be removed; thus, excavation and bank stabilization in this area is not planned.

RIVER OUTFALL LIMITS OF FESL, UPPER SLOPE STABILIZATION, AND RIPRAP SEE DWG PCN-012

**NOTE:**  
 1. ALL AREAS WITHIN CONSTRUCTION ACCESS RAMP GRADING LIMITS WILL BE RESTORED TO EXISTING GRADE, SEEDED, AND STABILIZED USING EROSION CONTROL FABRIC UNLESS NOTED OTHERWISE.



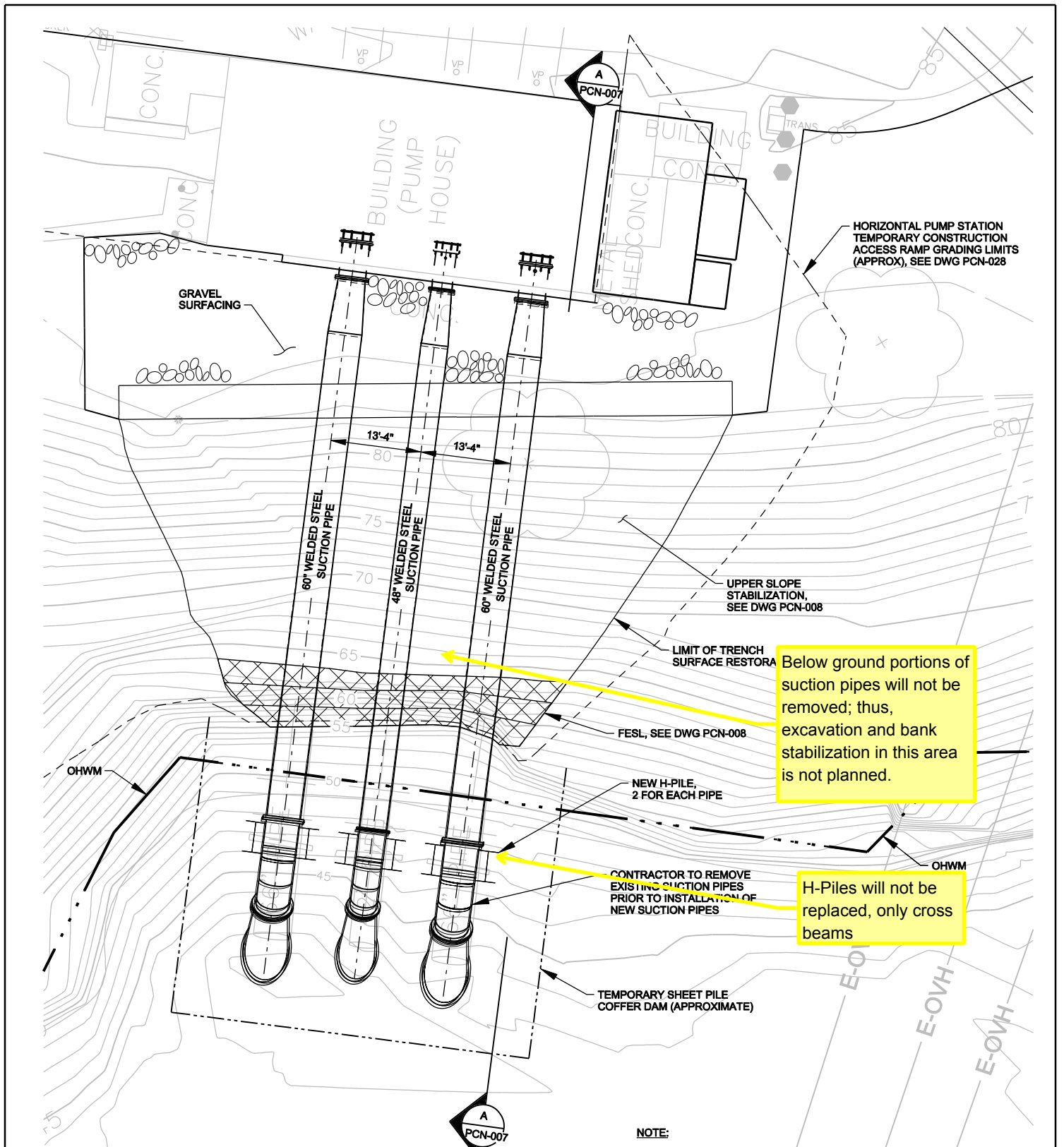
**SITE PLAN**  
 1"=50'



**GENERAL  
 SITE PLAN - RIVER INTAKE  
 AND OUTFALL**

PCN-005



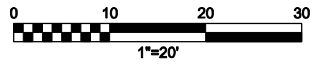


Below ground portions of suction pipes will not be removed; thus, excavation and bank stabilization in this area is not planned.

H-Piles will not be replaced, only cross beams

**NOTE:**  
 1. ALL AREAS WITHIN CONSTRUCTION ACCESS RAMP GRADING LIMITS WILL BE RESTORED TO EXISTING GRADE, SEEDED, AND STABILIZED USING EROSION CONTROL FABRIC UNLESS NOTED OTHERWISE.

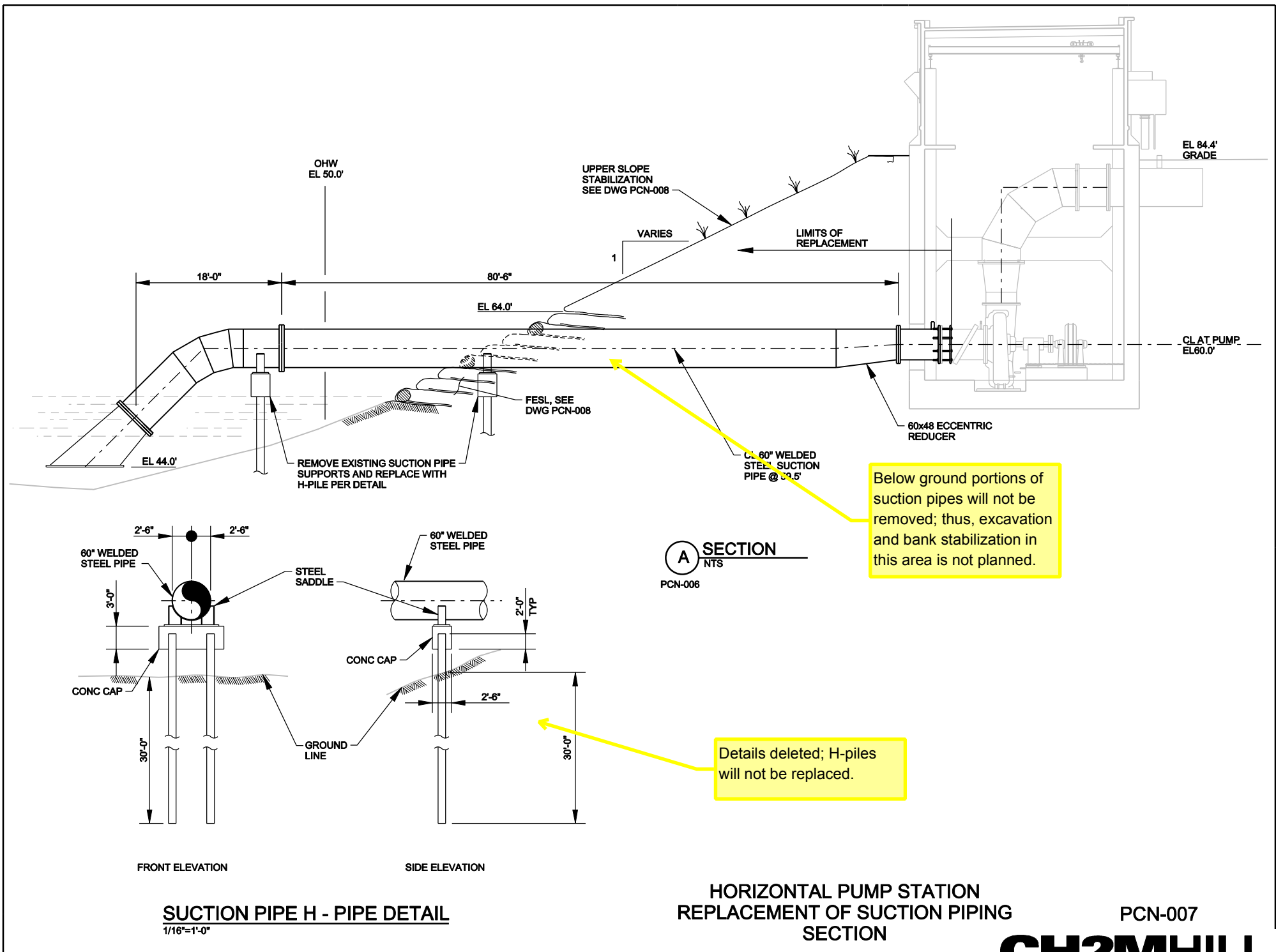
Notes detailing surface restoration added.

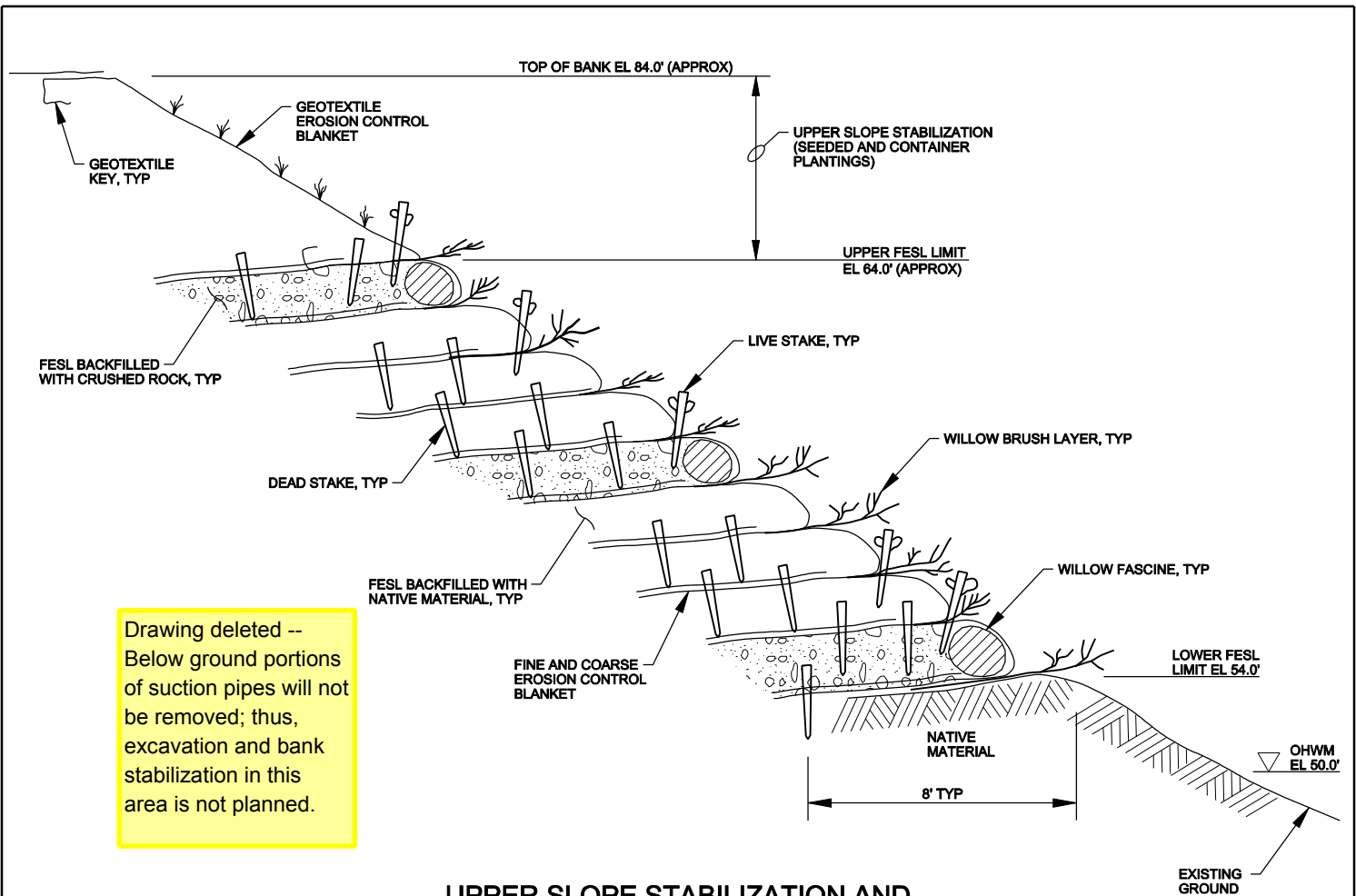


**SUCTION PIPING PLAN VIEW**  
 1"=20'

**HORIZONTAL PUMP STATION  
 REPLACEMENT OF SUCTION PIPING  
 PLAN**

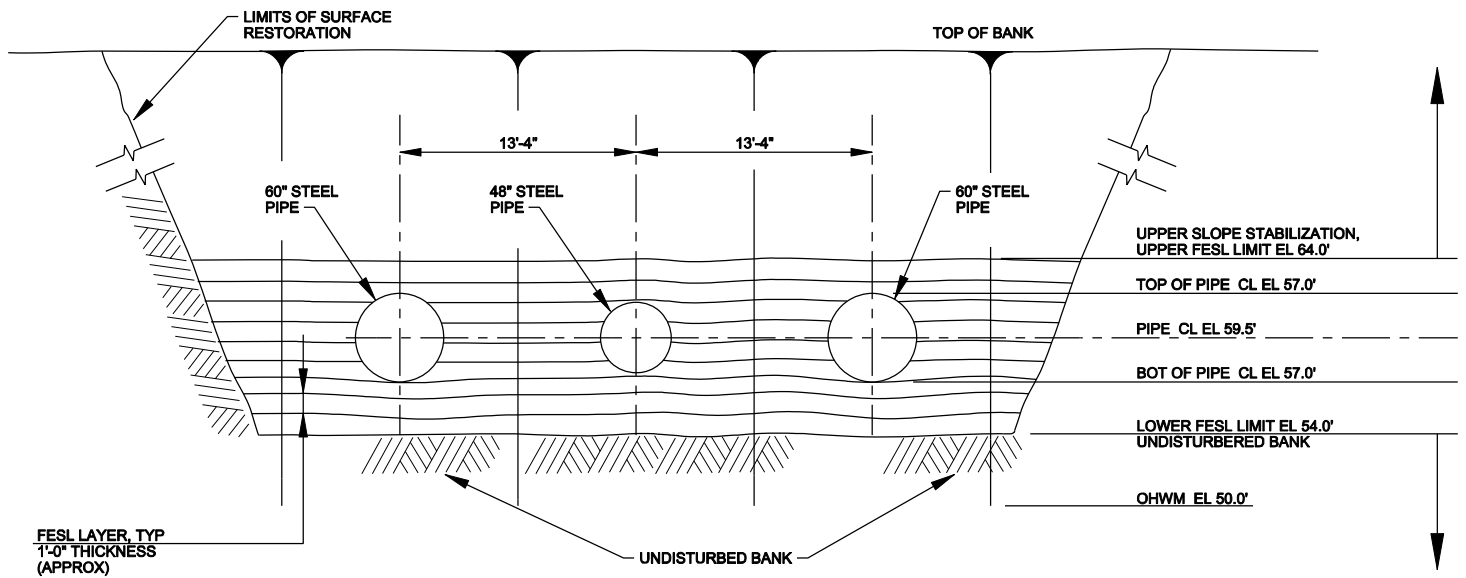
PCN-006





**UPPER SLOPE STABILIZATION AND FABRIC ENCAPSULATED SOIL LIFT (FESL)**

NTS



**FESL FRONT**

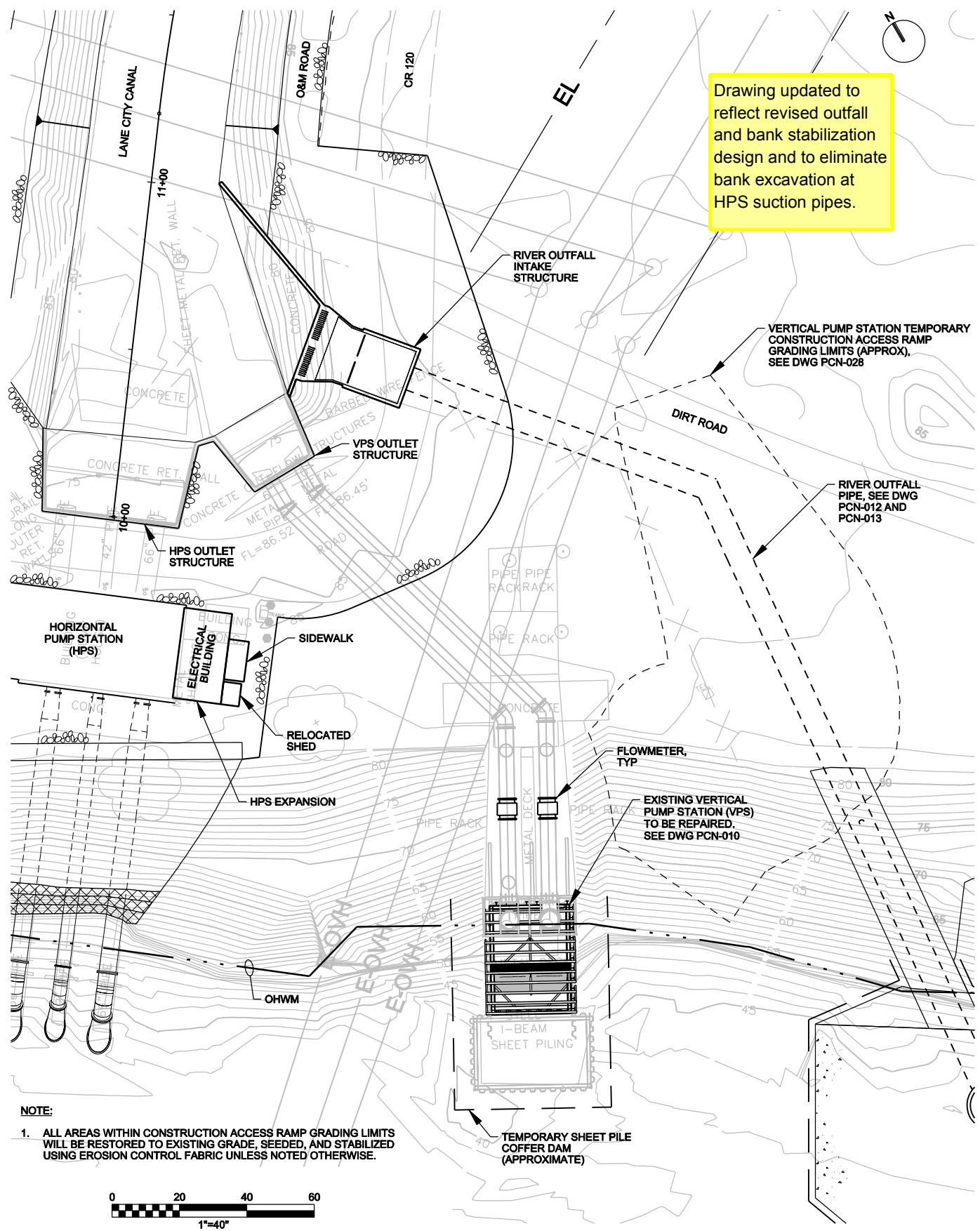
NTS

**HORIZONTAL PUMP STATION UPPER SLOPE STABILIZATION AND FESL DETAILS**

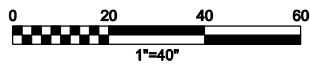
PCN-008



Drawing updated to reflect revised outfall and bank stabilization design and to eliminate bank excavation at HPS suction pipes.



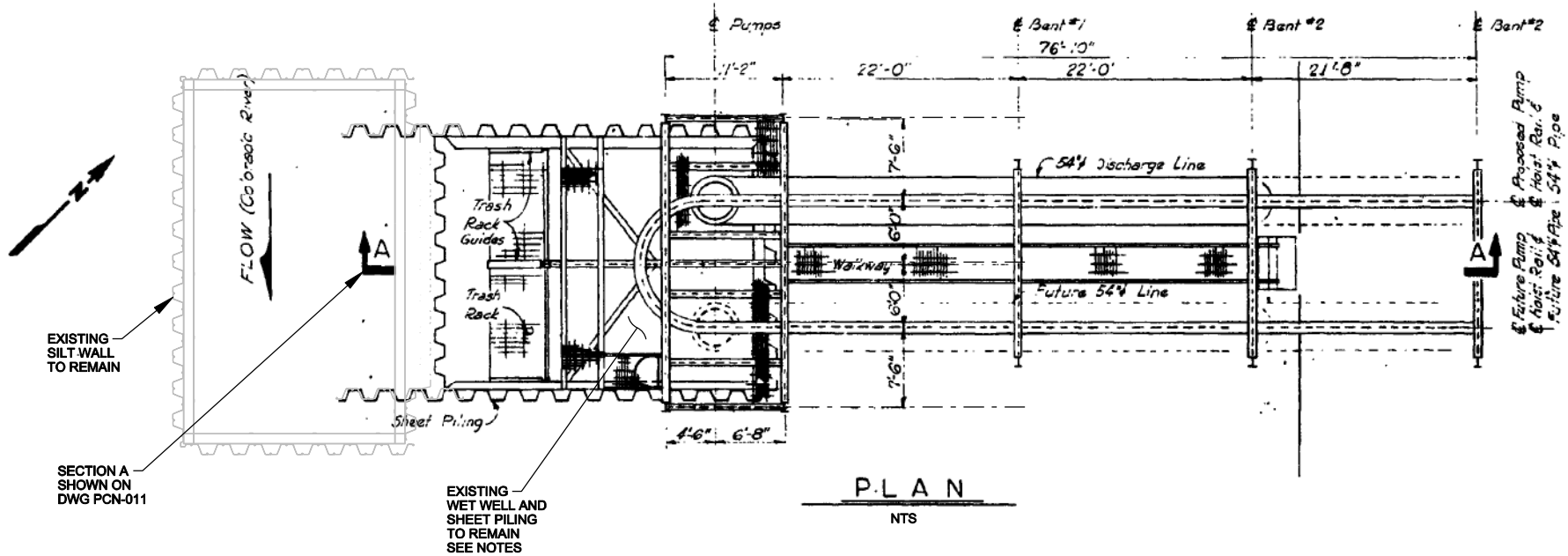
**NOTE:**  
1. ALL AREAS WITHIN CONSTRUCTION ACCESS RAMP GRADING LIMITS WILL BE RESTORED TO EXISTING GRADE, SEED, AND STABILIZED USING EROSION CONTROL FABRIC UNLESS NOTED OTHERWISE.



### VERTICAL PUMP STATION SITE PLAN

PCN-009





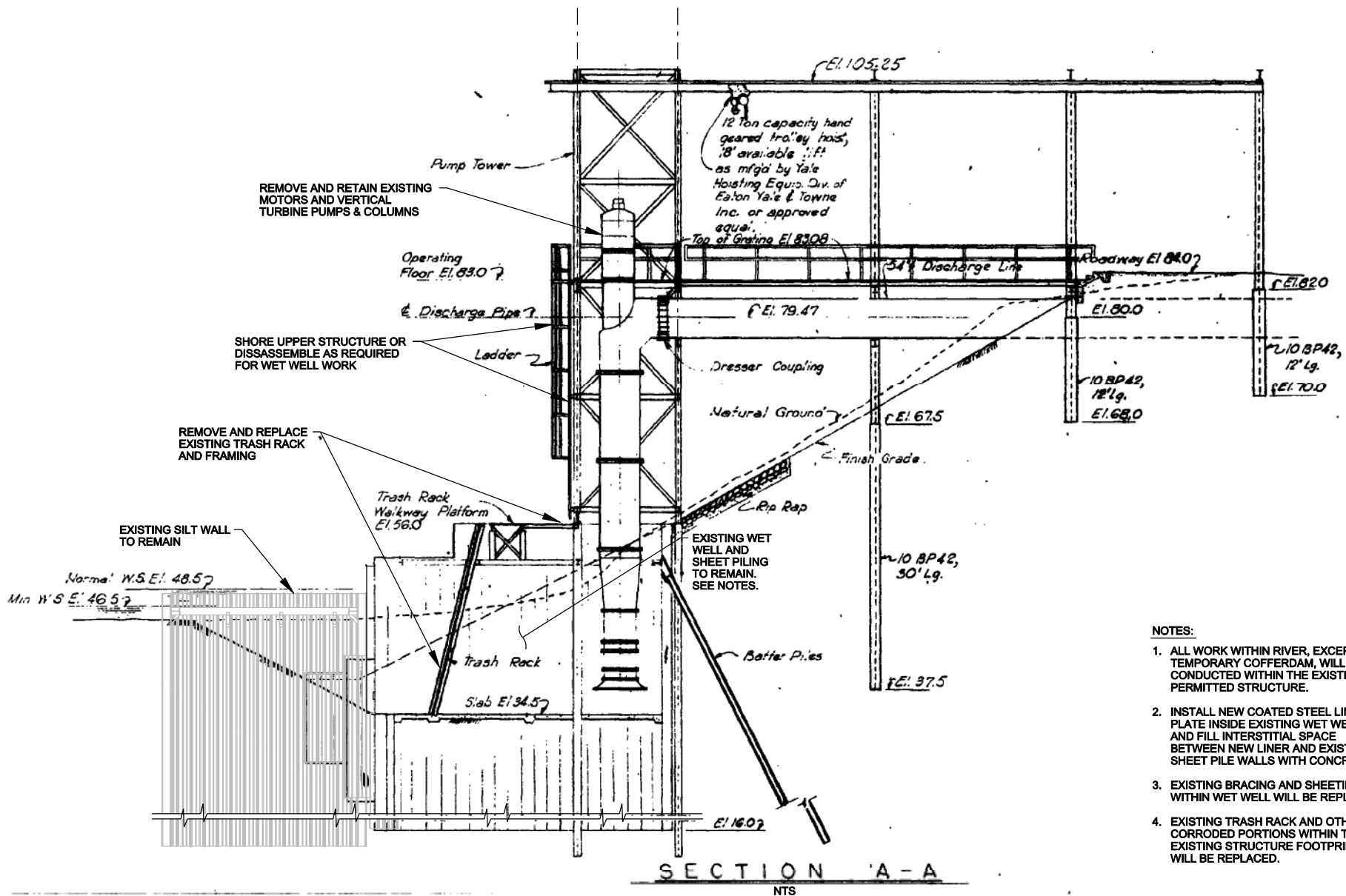
**NOTES:**

1. ALL WORK WITHIN THE RIVER, EXCEPT TEMPORARY COFFERDAM, WILL BE CONDUCTED WITHIN THE EXISTING PERMITTED STRUCTURE.
2. EXISTING BRACING AND SHEETING WITHIN WET WELL WILL BE REPLACED.
3. EXISTING TRASH RACK AND OTHER CORRODED PORTIONS WITHIN THE EXISTING STRUCTURE FOOTPRINT WILL BE REPLACED.

**VERTICAL TURBINE PUMP STATION  
INTAKE TOWER REPAIR PLAN**

PCN-010

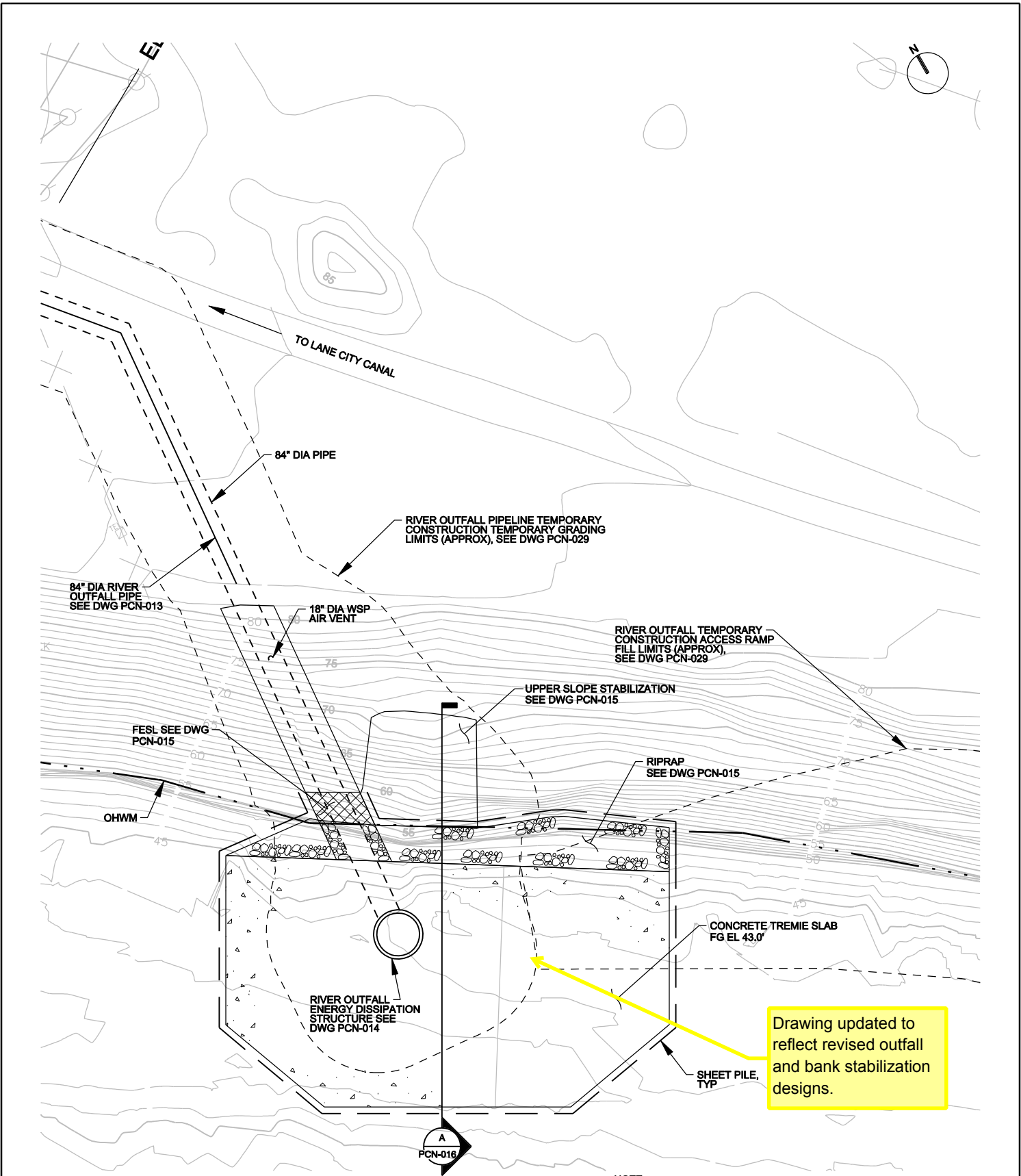
**CH2MHILL®**



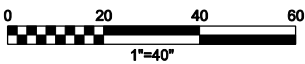
- NOTES:
1. ALL WORK WITHIN RIVER, EXCEPT TEMPORARY COFFERDAM, WILL BE CONDUCTED WITHIN THE EXISTING PERMITTED STRUCTURE.
  2. INSTALL NEW COATED STEEL LINER PLATE INSIDE EXISTING WET WELL AND FILL INTERSTITIAL SPACE BETWEEN NEW LINER AND EXISTING SHEET PILE WALLS WITH CONCRETE.
  3. EXISTING BRACING AND SHEETING WITHIN WET WELL WILL BE REPLACED.
  4. EXISTING TRASH RACK AND OTHER CORRODED PORTIONS WITHIN THE EXISTING STRUCTURE FOOTPRINT WILL BE REPLACED.

VERTICAL TURBINE PUMP STATION  
INTAKE TOWER REPAIR SECTION

PCN-011



Drawing updated to reflect revised outfall and bank stabilization designs.

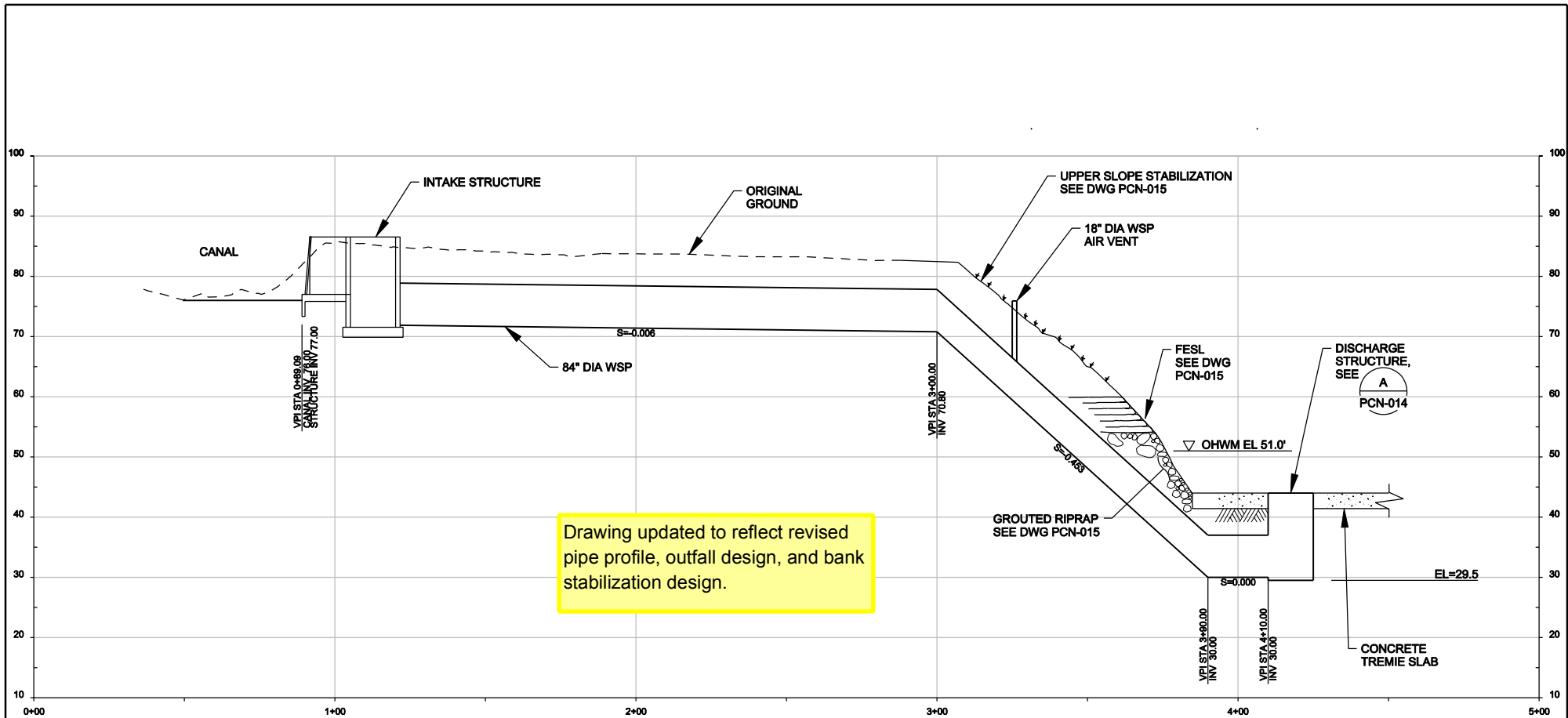


- NOTE:**
1. ALL AREAS WITHIN CONSTRUCTION ACCESS RAMP GRADING LIMITS WILL BE RESTORED TO EXISTING GRADE, SEED, AND STABILIZED USING EROSION CONTROL FABRIC UNLESS NOTED OTHERWISE.

Notes detailing surface restoration added.

**RIVER OUTFALL  
SITE PLAN**

**PCN-012**



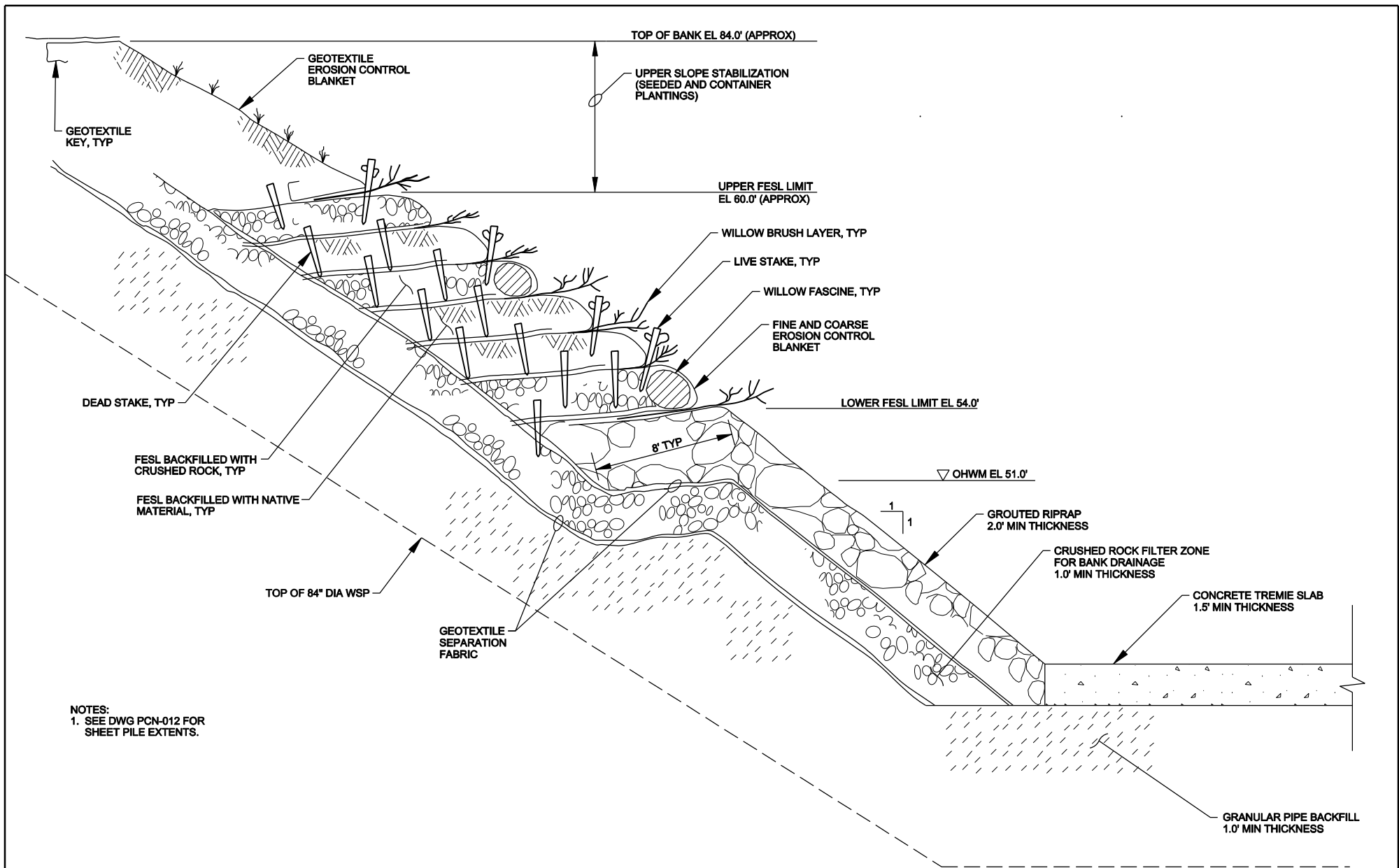
Drawing updated to reflect revised pipe profile, outfall design, and bank stabilization design.

**RIVER OUTFALL PIPE PROFILE**  
 HORIZ: 1"=50'  
 VERT: 1"=25'

**RIVER OUTFALL  
 PIPELINE PROFILE**

PCN-013





NOTES:  
 1. SEE DWG PCN-012 FOR SHEET PILE EXTENTS.

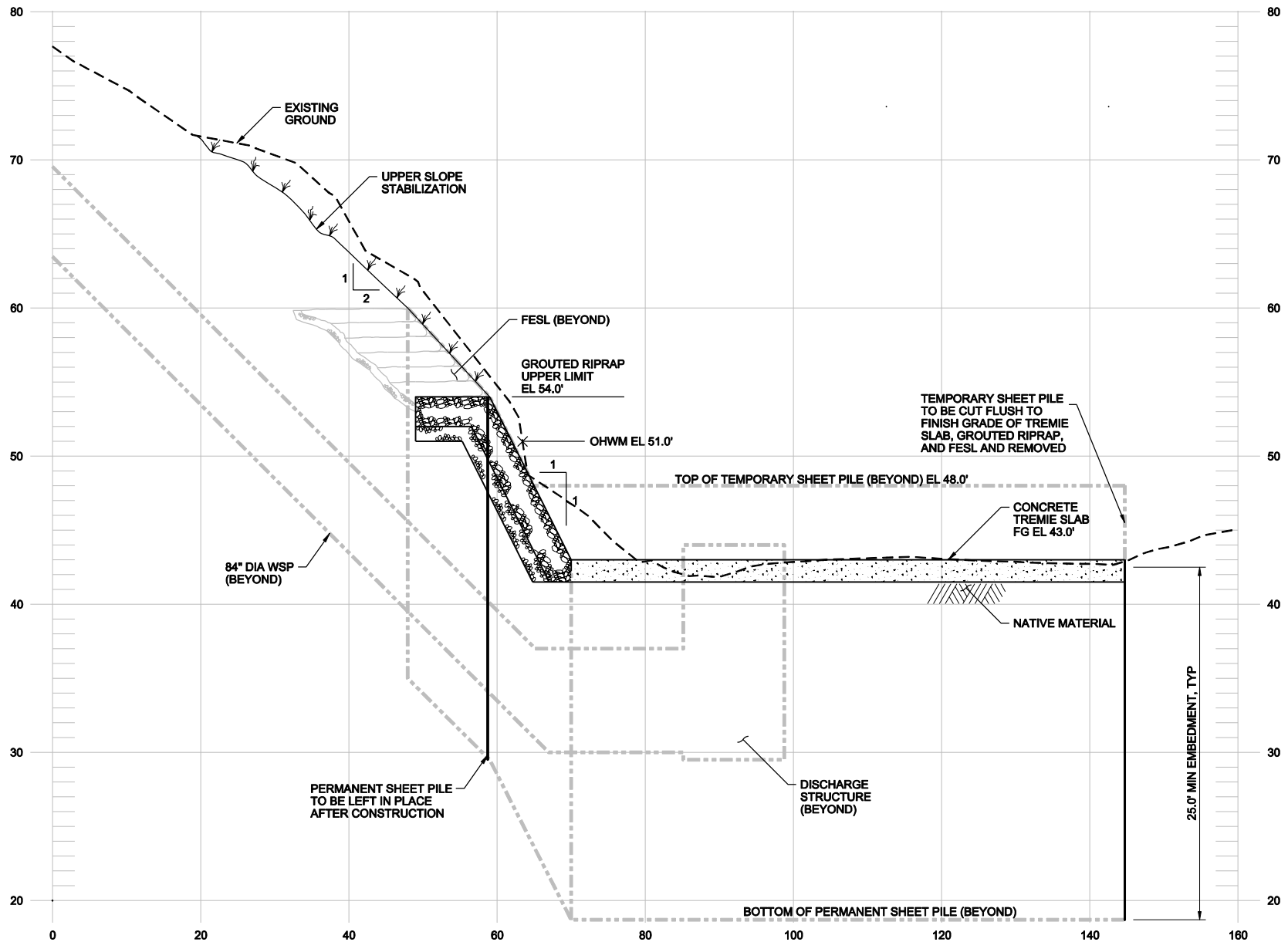
Drawing updated to reflect revised outfall and bank stabilization design.

**UPPER SLOPE STABILIZATION AND FESL**  
 NTS

**RIVER OUTFALL UPPER SLOPE STABILIZATION AND FESL DETAIL**

PCN-015



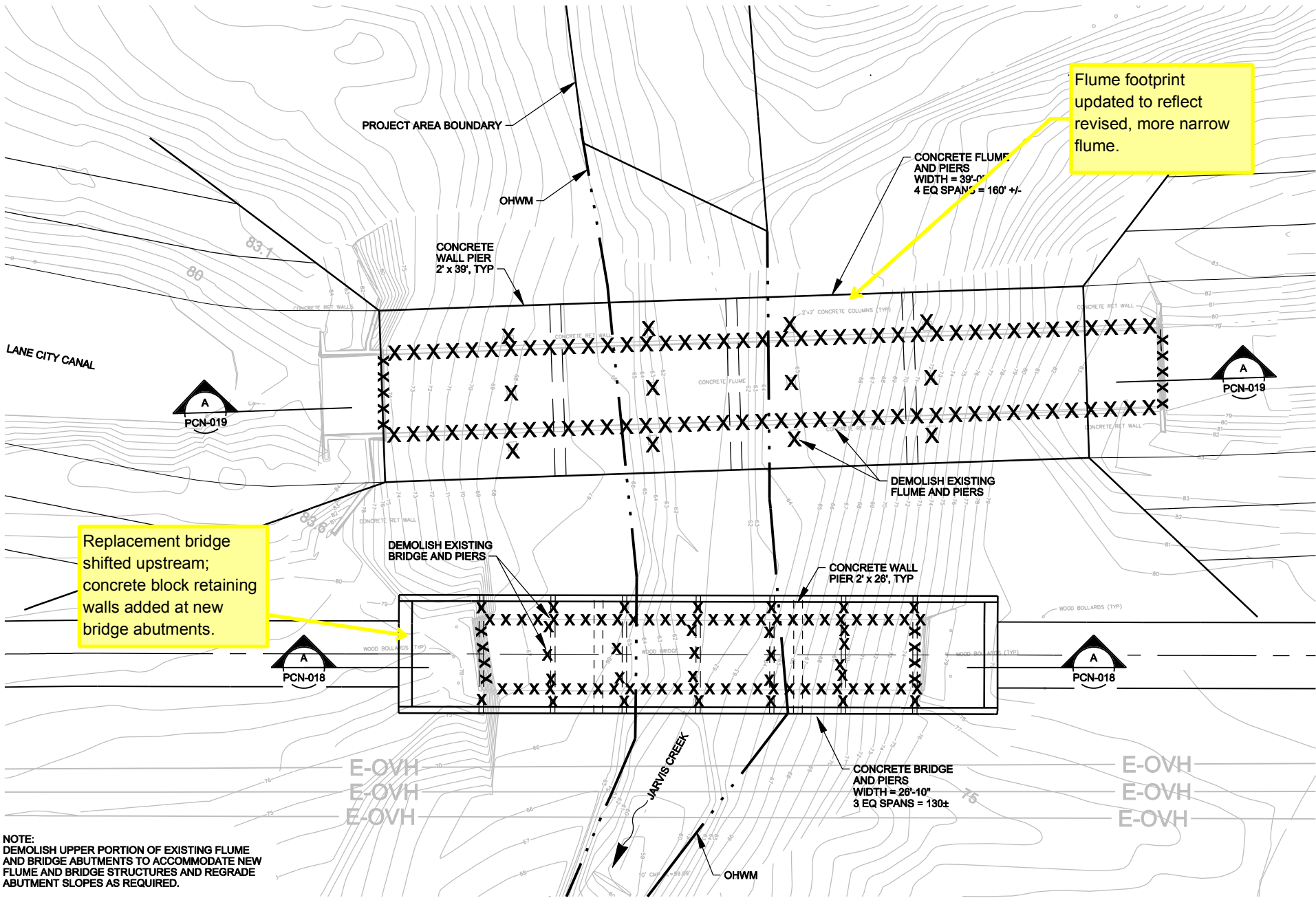


Drawing updated to reflect revised outfall and bank stabilization design.

**A SECTION**  
 HORIZ: 1"=20'  
 VERT: 1"=10'

**RIVER OUTFALL TREMIE SLAB AND SHEETPILE SECTION**

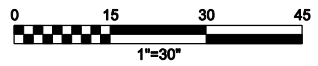
PCN-016



Flume footprint updated to reflect revised, more narrow flume.

Replacement bridge shifted upstream; concrete block retaining walls added at new bridge abutments.

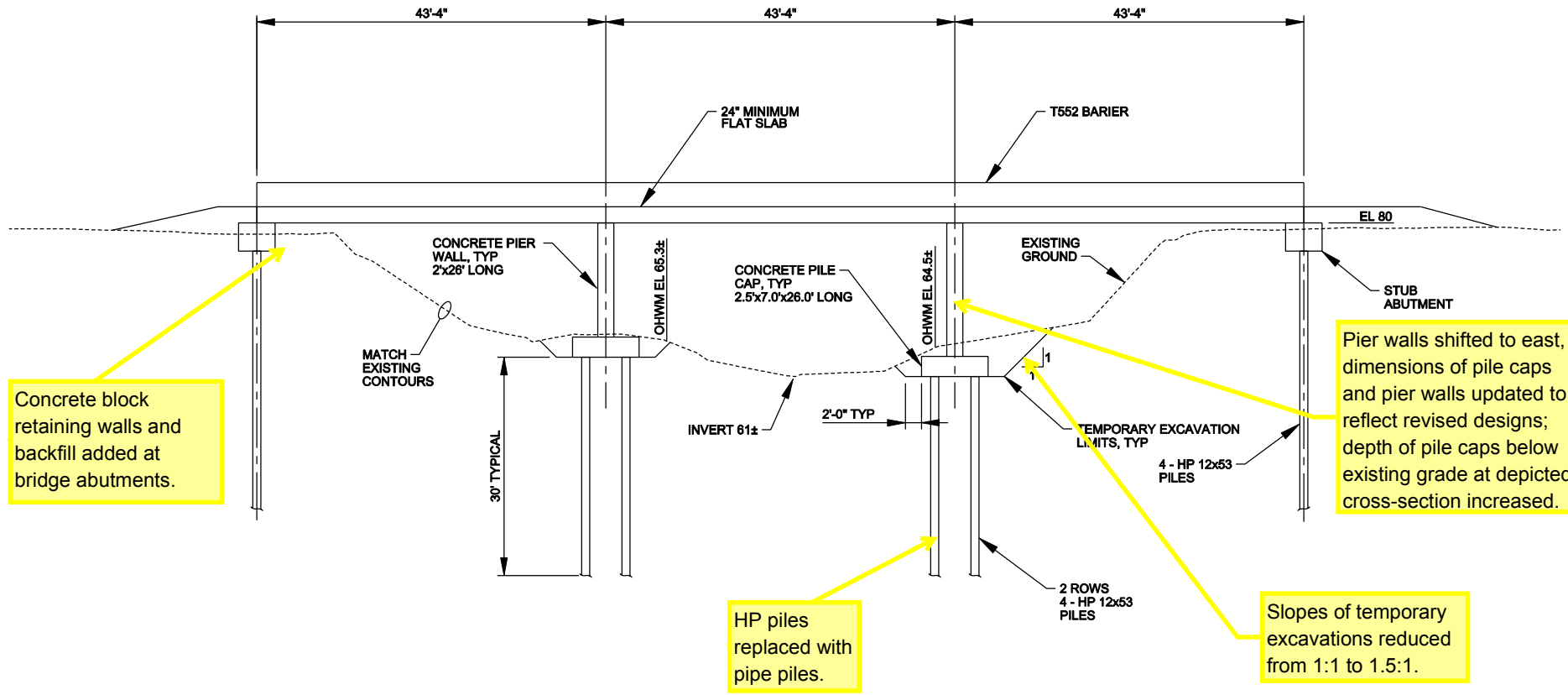
NOTE: DEMOLISH UPPER PORTION OF EXISTING FLUME AND BRIDGE ABUTMENTS TO ACCOMMODATE NEW FLUME AND BRIDGE STRUCTURES AND REGRADE ABUTMENT SLOPES AS REQUIRED.



CR120 JARVIS CREEK BRIDGE AND CANAL FLUME PLAN

PCN-017

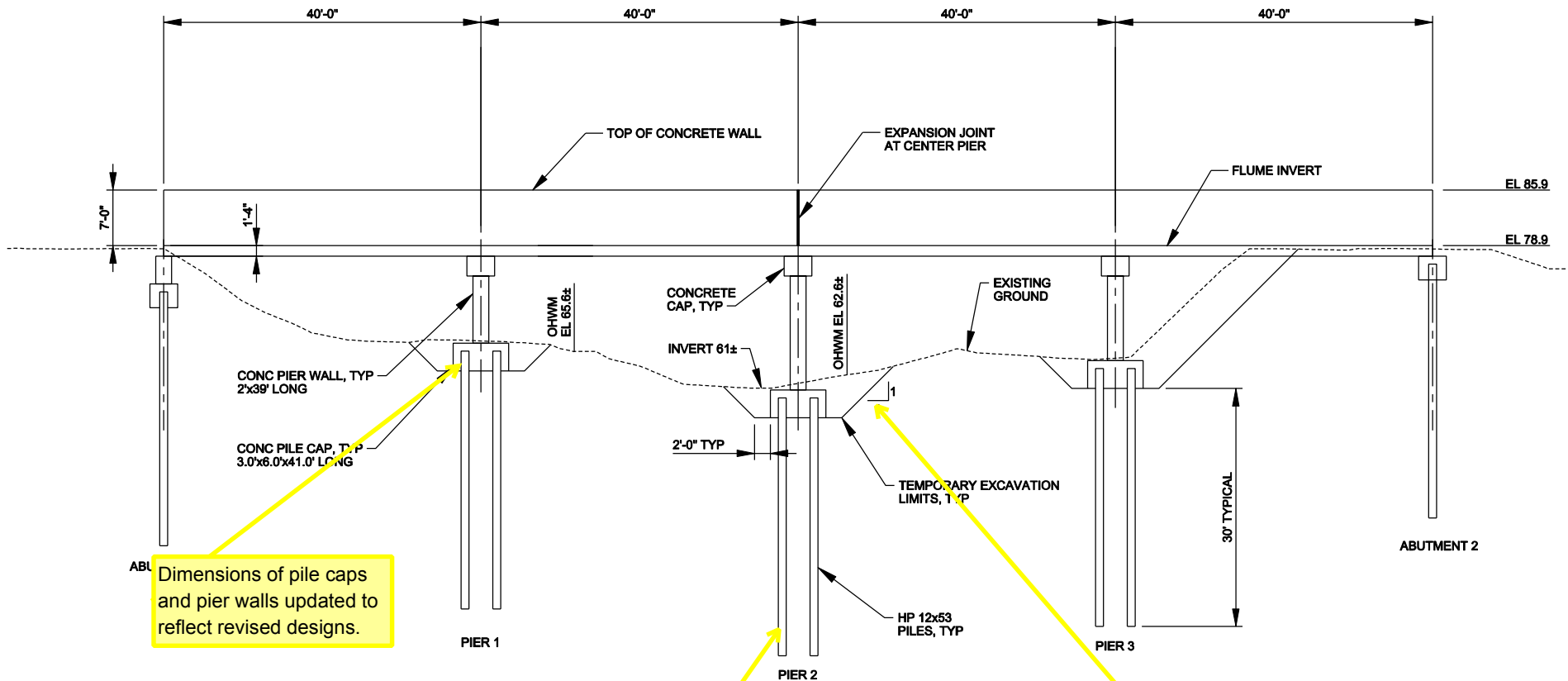




**BRIDGE SECTION**  
 1"=20' (SOUTH ELEVATION)

CR 120 JARVIS CREEK  
 BRIDGE SECTION

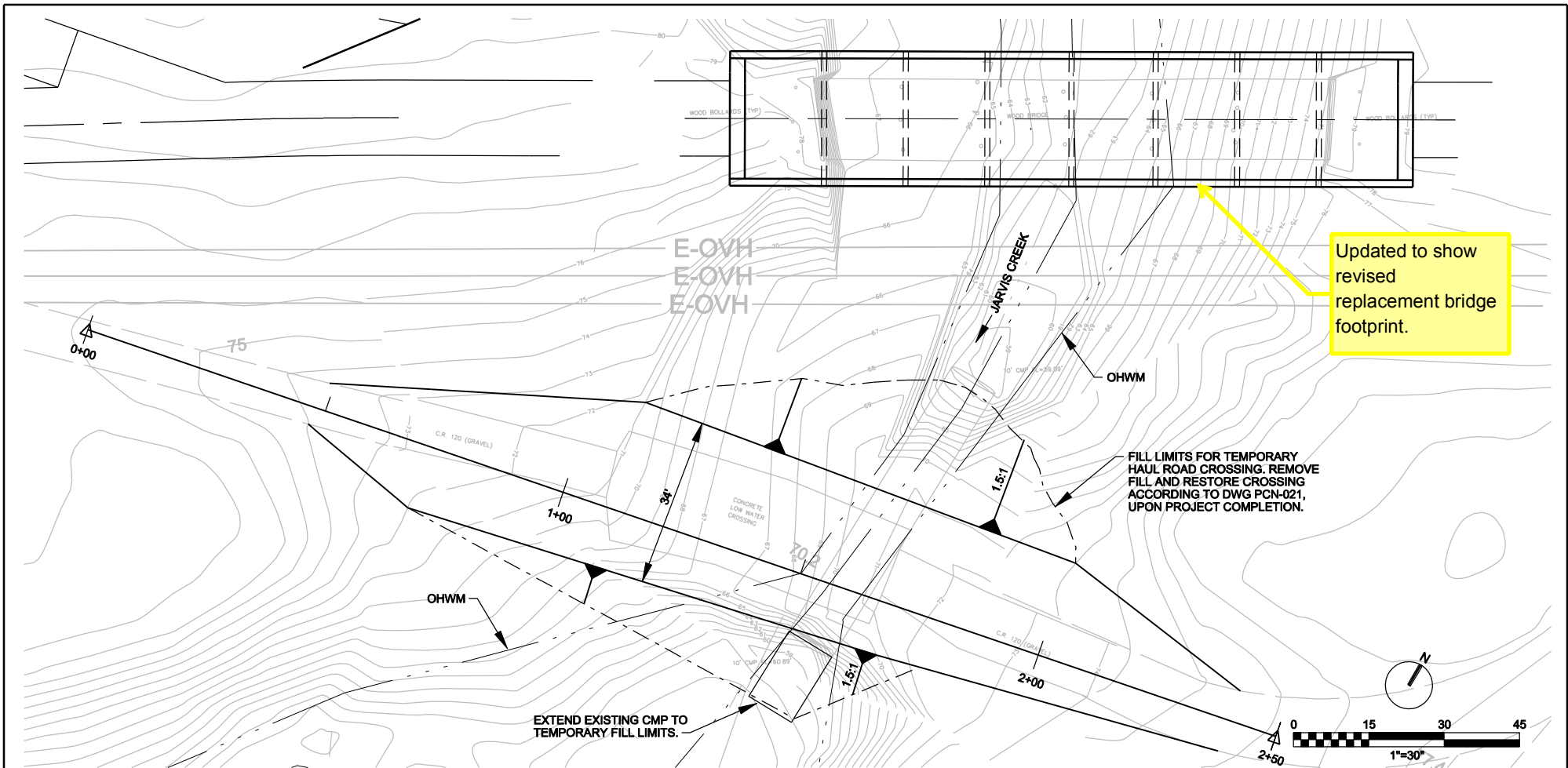
PCN-018



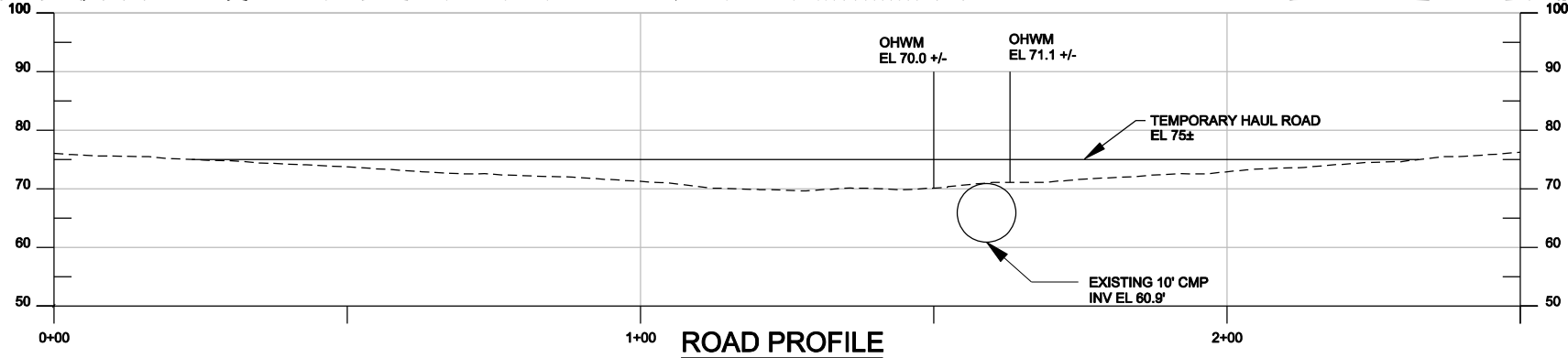
**FLUME SECTION**  
1"=20' (SOUTH ELEVATION)

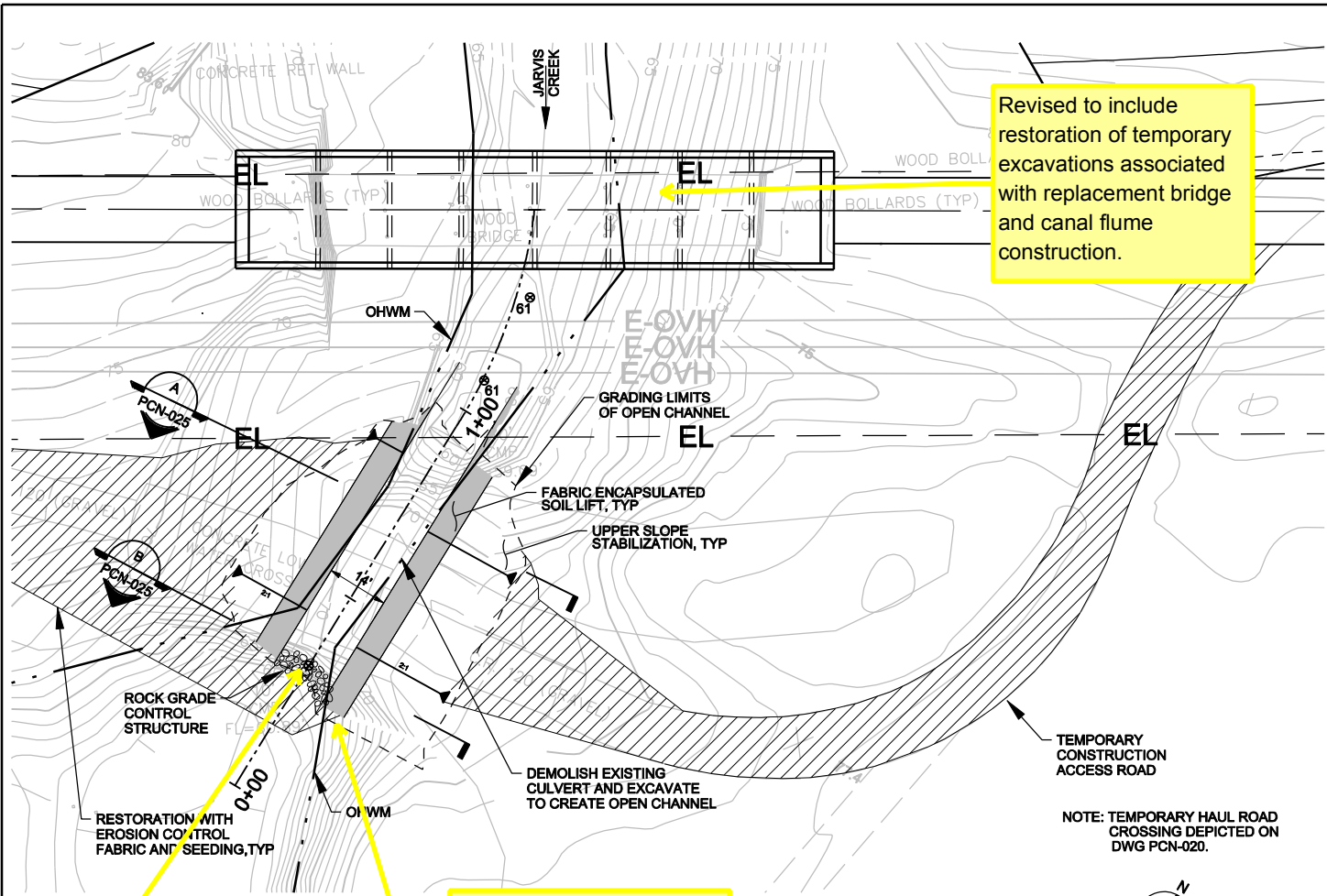
**LANE CITY CANAL  
FLUME SECTION**

PCN-019



FILL LIMITS FOR TEMPORARY HAUL ROAD CROSSING. REMOVE FILL AND RESTORE CROSSING ACCORDING TO DWG PCN-021, UPON PROJECT COMPLETION.



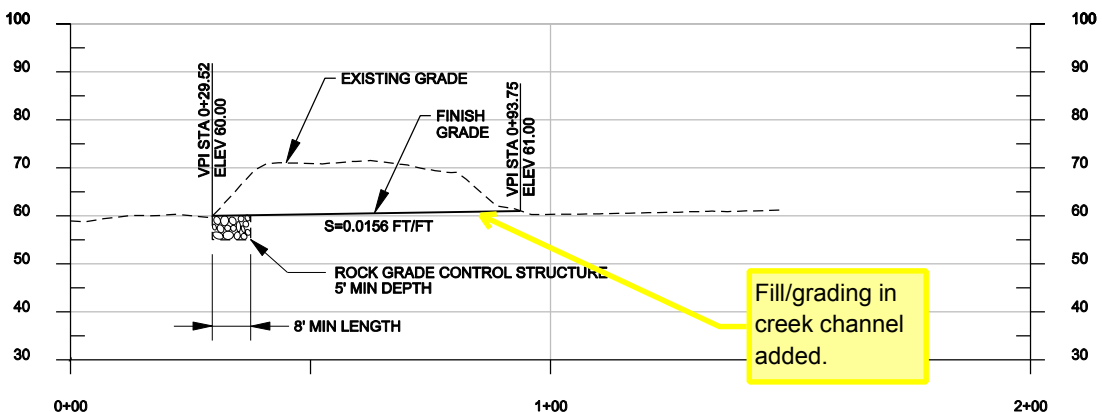
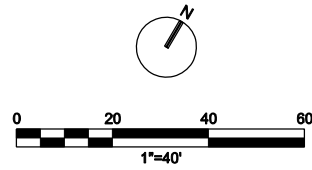


Revised to include restoration of temporary excavations associated with replacement bridge and canal flume construction.

Grade control structure moved upstream.

FESL extended downstream on both banks to facilitate outfall to creek from new storm water drainage ditch and better transition of flow from creek channel to downstream pool.

Surface restoration notes added.



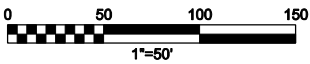
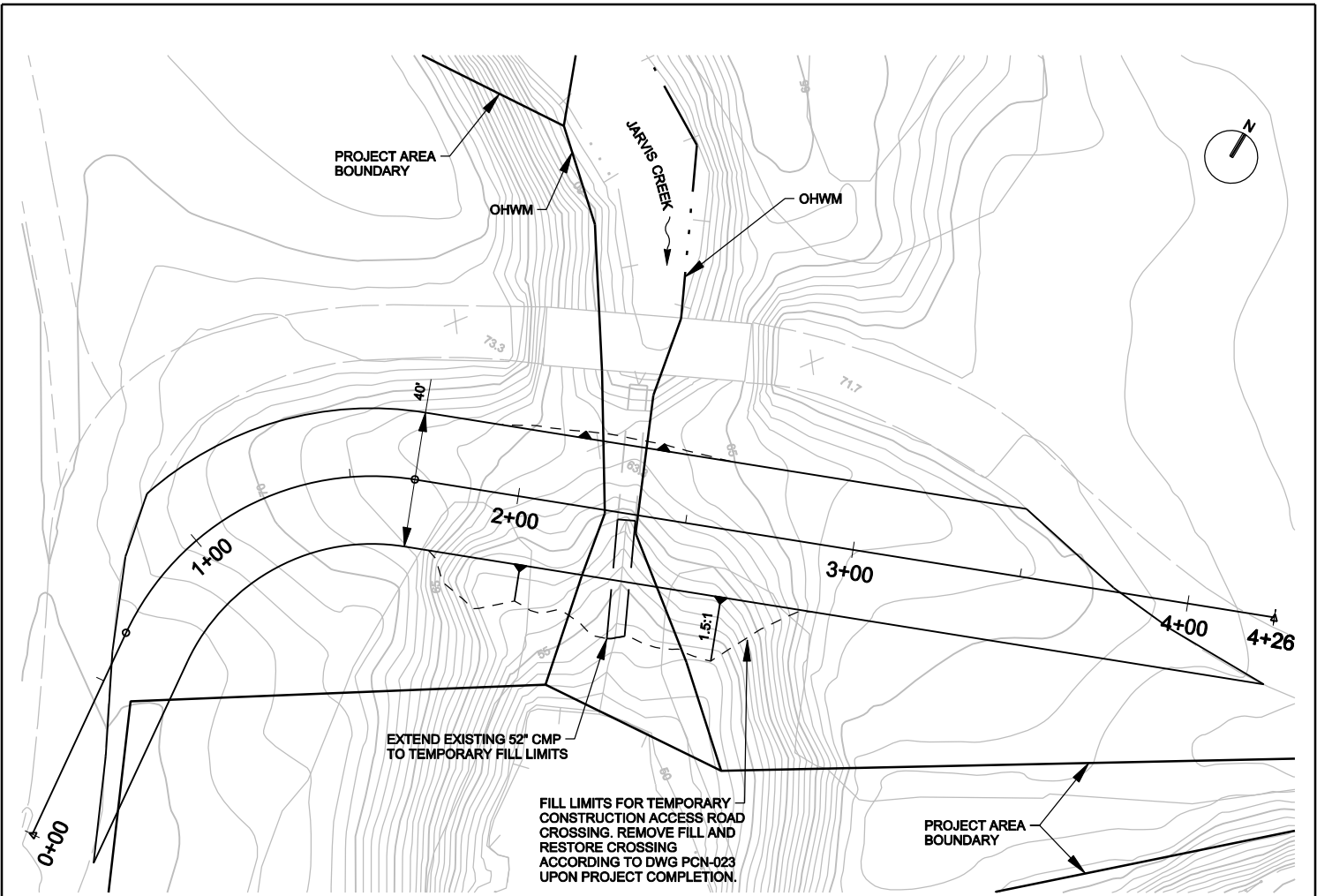
Fill/grading in creek channel added.

**CHANNEL PROFILE**  
1"=40'

**CR120 JARVIS CREEK CROSSING RESTORATION SITE PLAN**

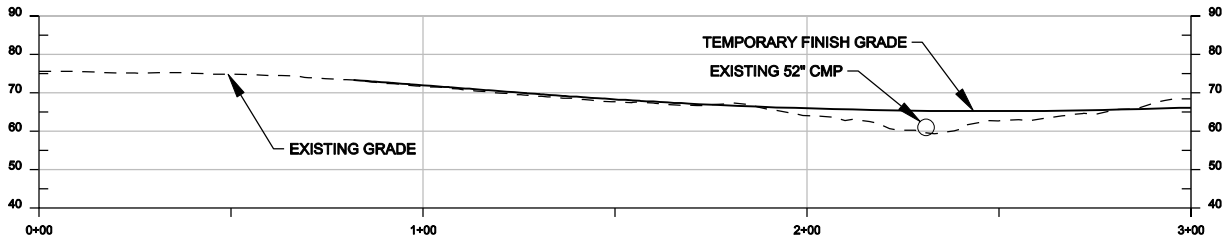
PCN-021





**NOTES:**

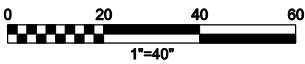
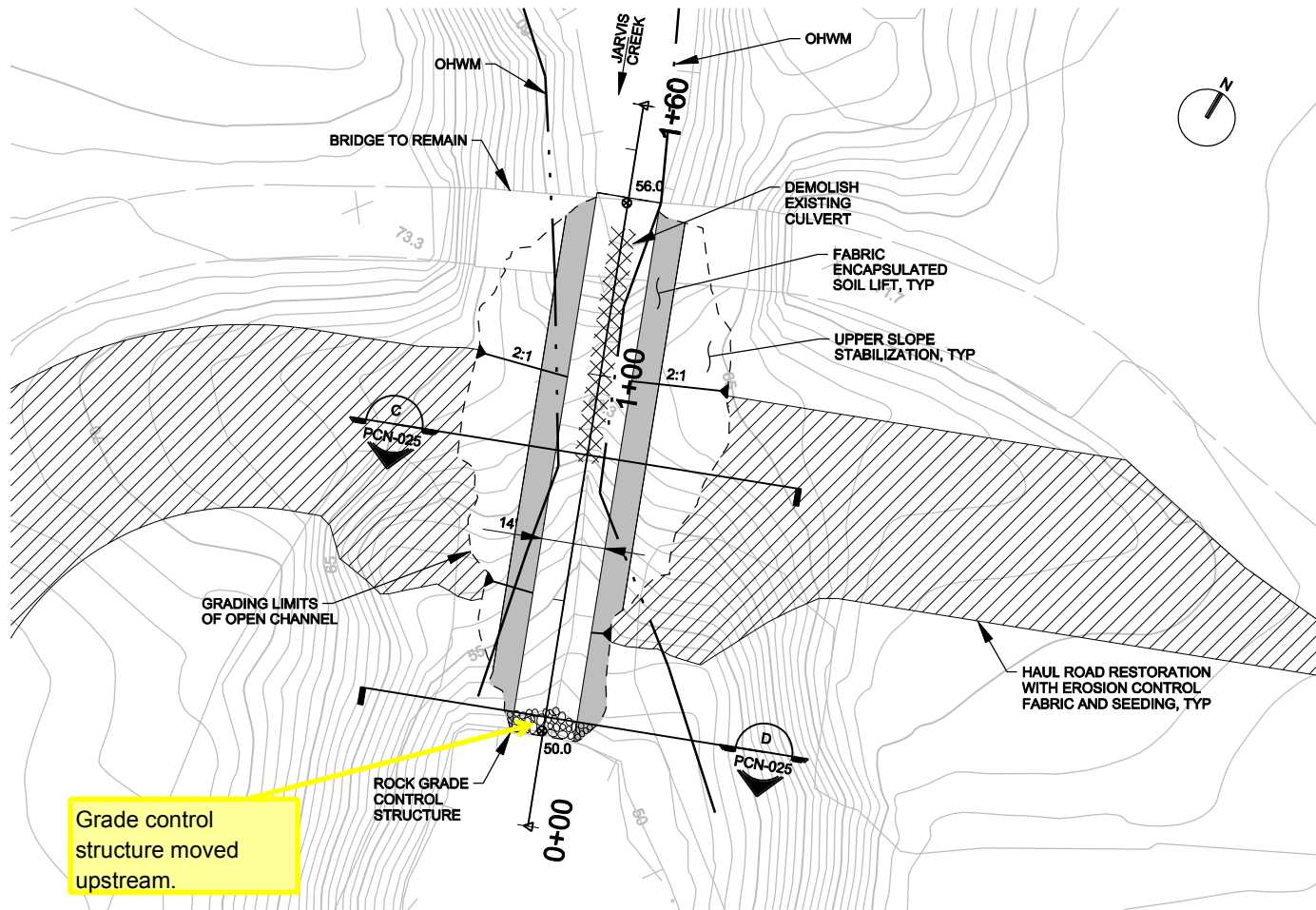
1. APPROXIMATE OHWM PROVIDED BY CLIENT.



**ROAD PROFILE**  
1"=50'

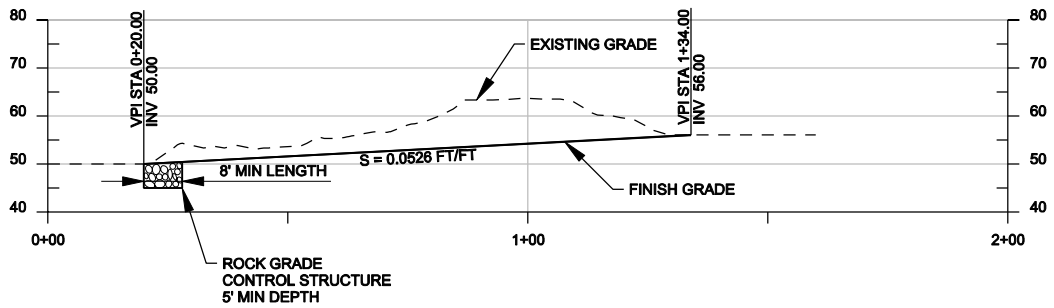
**CR 116  
JARVIS CREEK TEMPORARY  
HAUL ROAD CROSSING  
PLAN AND SECTION**

PCN-022



- NOTES:**
1. TEMPORARY CONSTRUCTION ACCESS ROAD CROSSING DEPICTED IN DWG PCN-022.
  2. APPROXIMATE OHWM PROVIDED BY CLIENT.

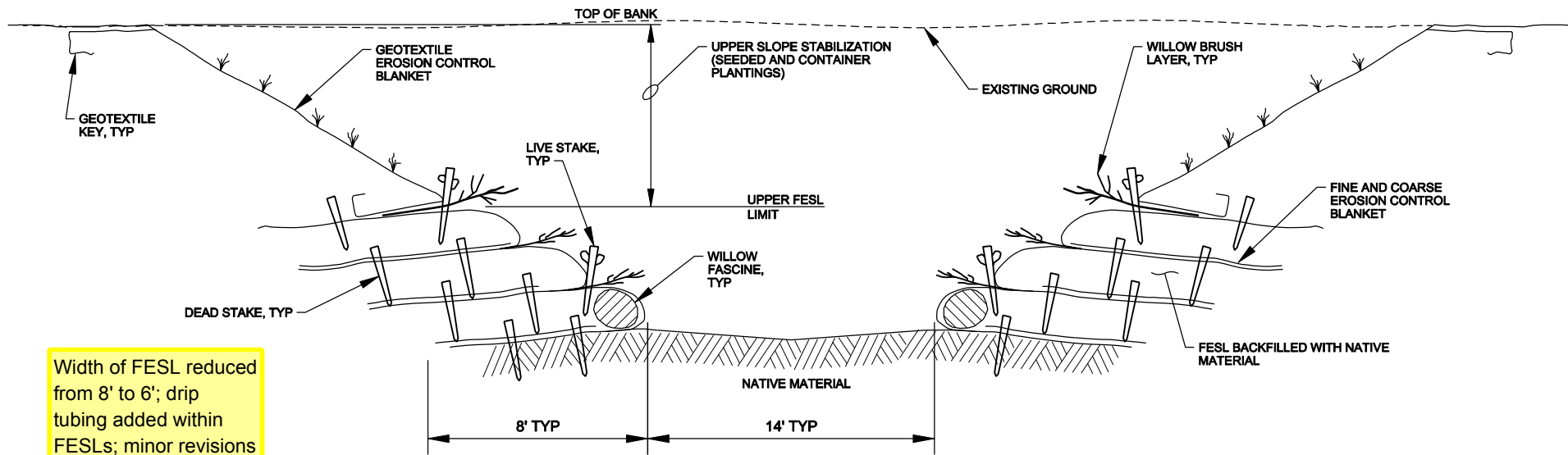
Surface restoration notes added.



**CHANNEL PROFILE**  
1"=40'

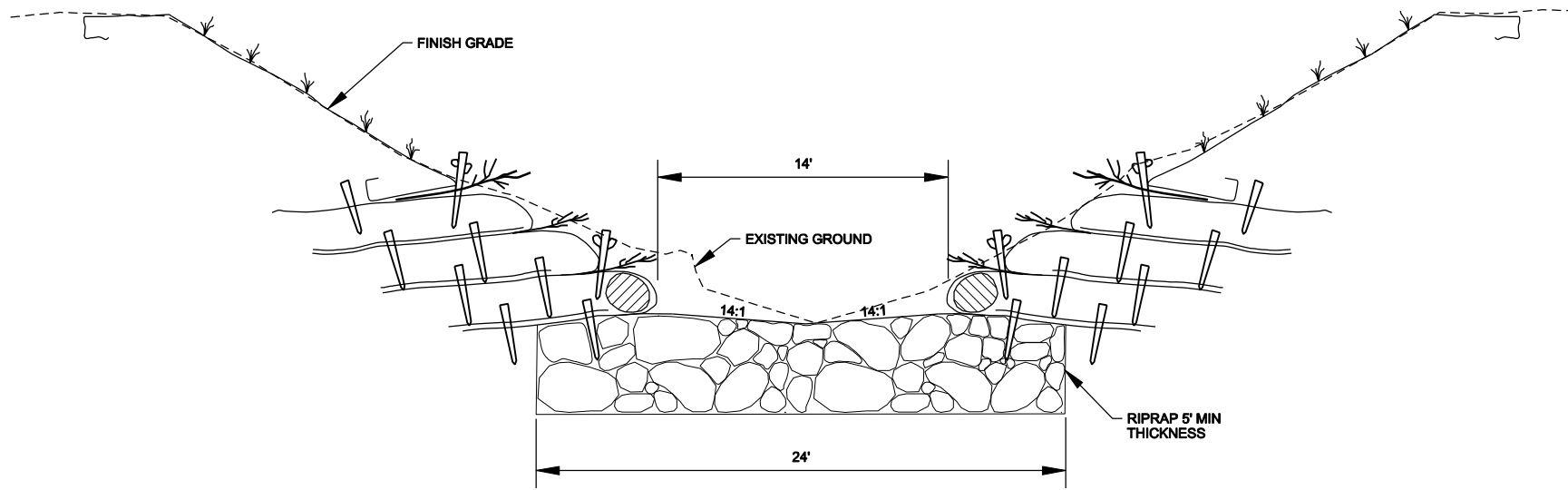
**CR 116 JARVIS CREEK CROSSING RESTORATION SITE PLAN**

PCN-023



Width of FESL reduced from 8' to 6'; drip tubing added within FESLs; minor revisions to restoration notations.

**CREEK RESTORATION SECTION**  
NTS

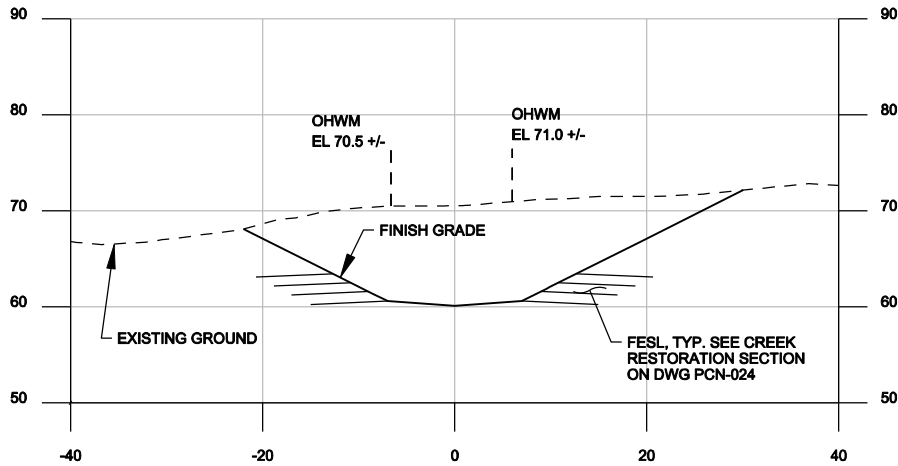


**ROCK GRADE CONTROL STRUCTURE SECTION**  
NTS

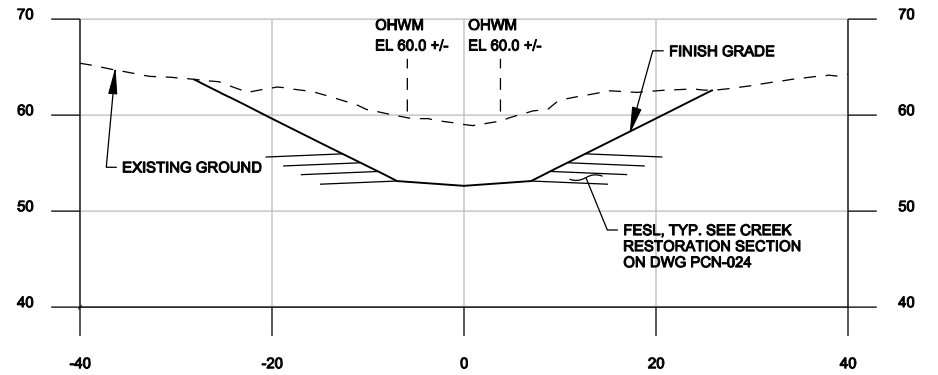
TYPICAL  
JARVIS CREEK RESTORATION  
SECTIONS

PCN-024

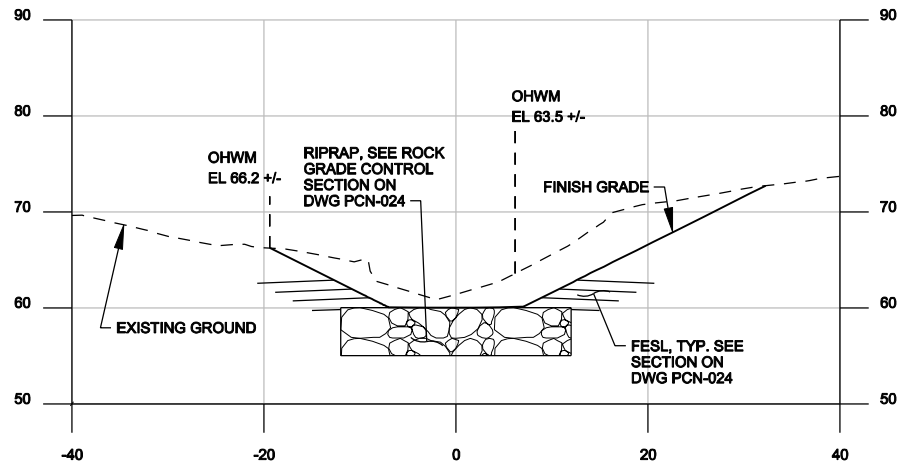




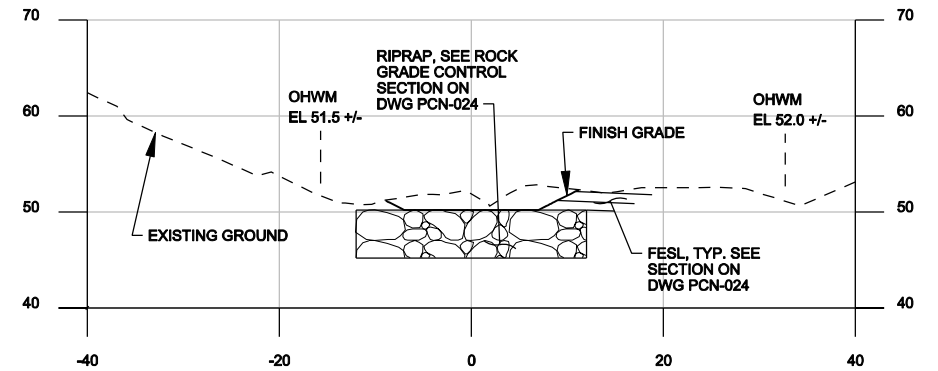
**A** SECTION  
1"=20'  
PCN-021



**C** SECTION  
1"=20'  
PCN-023



**B** SECTION  
1"=20'  
PCN-021



**D** SECTION  
1"=20'  
PCN-023

CR 120 AND CR 116  
JARVIS CREEK RESTORATION  
SECTIONS

PCN-025

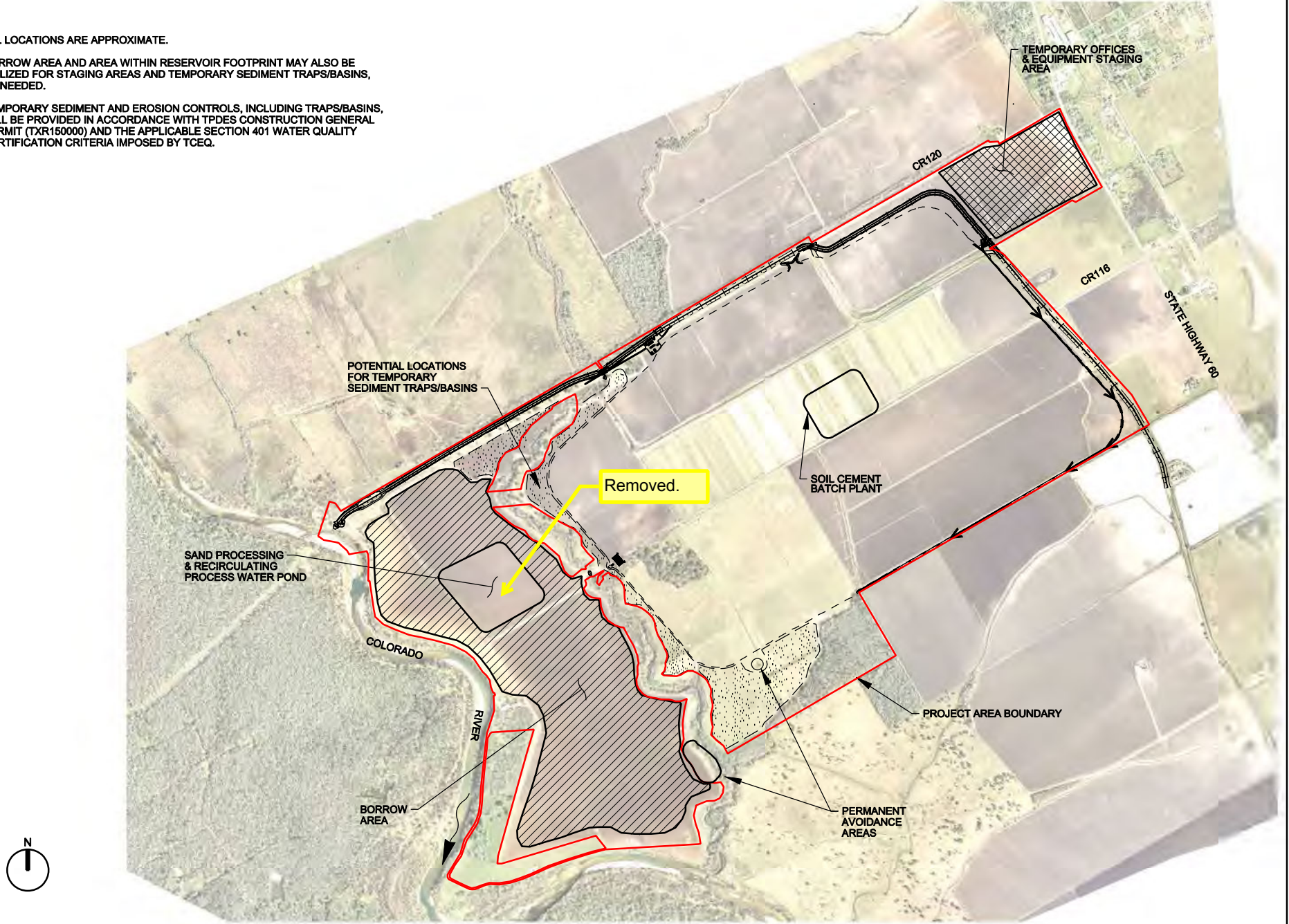






**NOTES:**

1. ALL LOCATIONS ARE APPROXIMATE.
2. BORROW AREA AND AREA WITHIN RESERVOIR FOOTPRINT MAY ALSO BE UTILIZED FOR STAGING AREAS AND TEMPORARY SEDIMENT TRAPS/BASINS, AS NEEDED.
3. TEMPORARY SEDIMENT AND EROSION CONTROLS, INCLUDING TRAPS/BASINS, WILL BE PROVIDED IN ACCORDANCE WITH TPDES CONSTRUCTION GENERAL PERMIT (TXR150000) AND THE APPLICABLE SECTION 401 WATER QUALITY CERTIFICATION CRITERIA IMPOSED BY TCEQ.



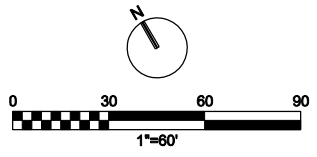
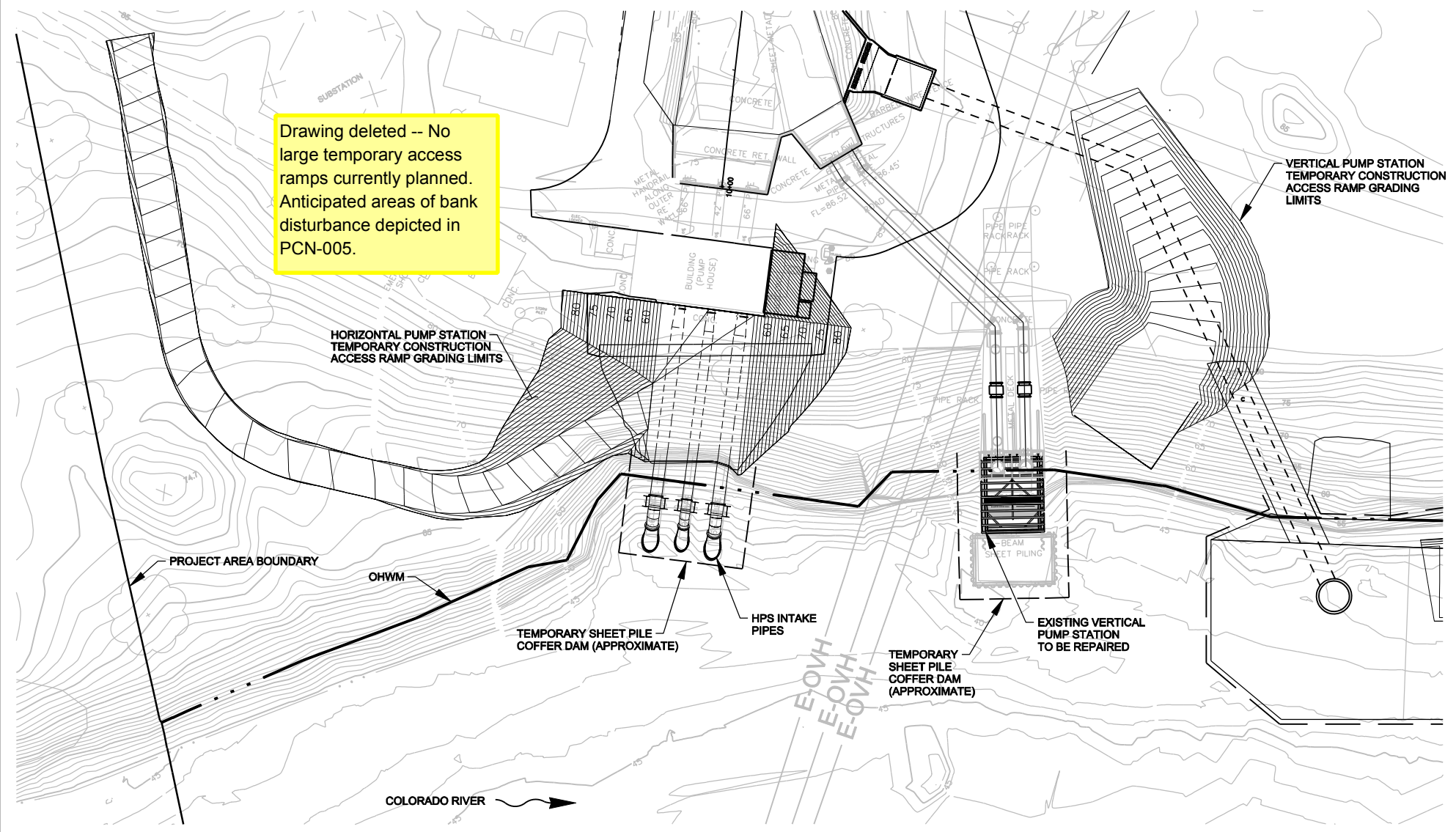
**GENERAL  
CONSTRUCTION  
SITE LAYOUT**

PCN-027

**CH2MHILL®**



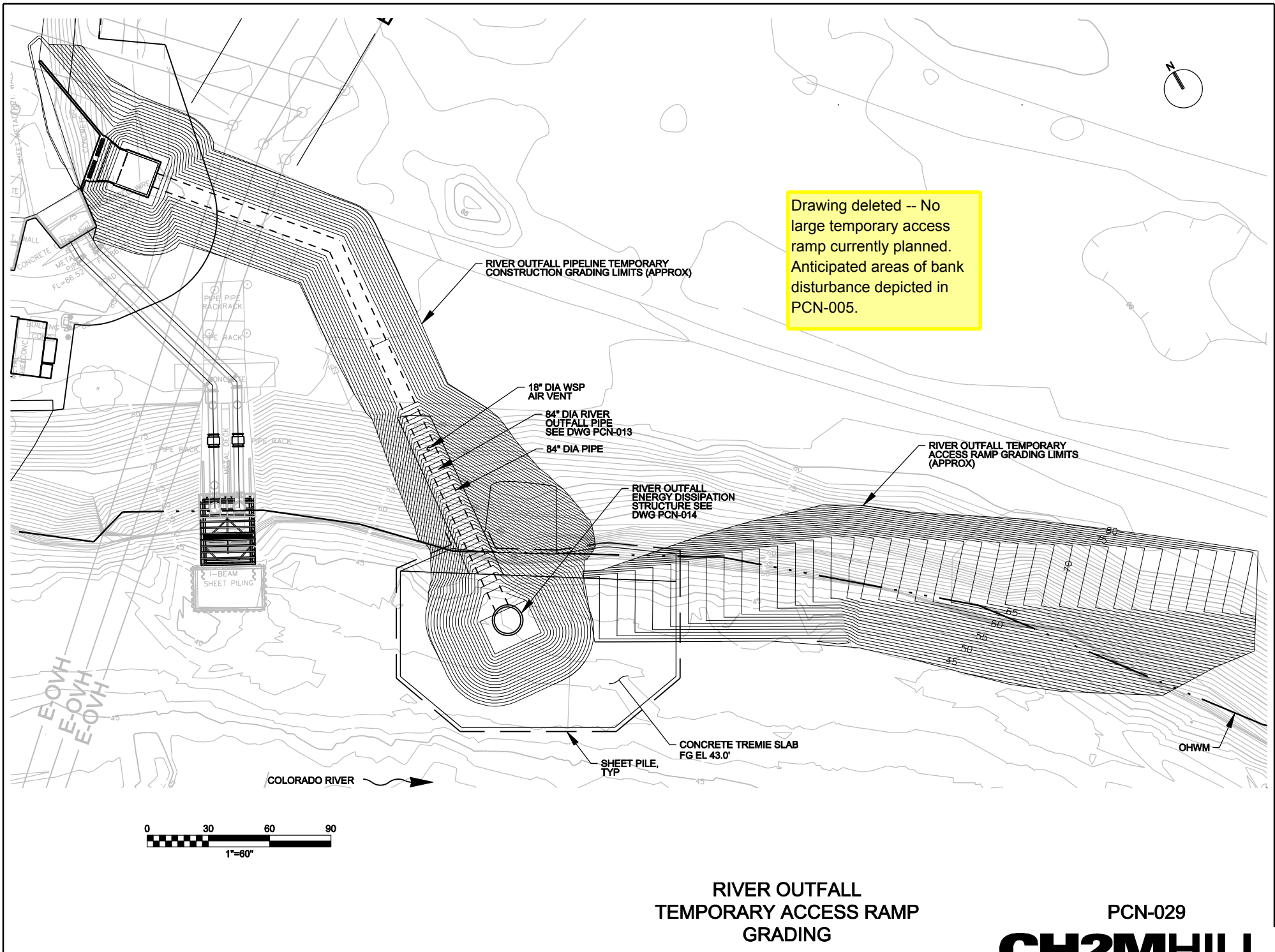
Drawing deleted -- No large temporary access ramps currently planned. Anticipated areas of bank disturbance depicted in PCN-005.



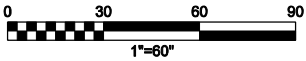
**SUCTION PIPING PLAN VIEW**  
1"=60'

**HORIZONTAL AND VERTICAL PUMP STATION  
TEMPORARY ACCESS RAMP  
GRADING**

PCN-028



Drawing deleted -- No large temporary access ramp currently planned. Anticipated areas of bank disturbance depicted in PCN-005.



RIVER OUTFALL  
TEMPORARY ACCESS RAMP  
GRADING

PCN-029



**Attachment 2**  
**USACE Preliminary Jurisdictional Determination**



**DEPARTMENT OF THE ARMY**  
GALVESTON DISTRICT, CORPS OF ENGINEERS  
P. O. BOX 1229  
GALVESTON, TEXAS 77553-1229

October 8, 2013

RECEIVED

OCT 11 2013

**HENRY EBY**  
DEPUTY GENERAL MANAGER

Compliance Section

**SUBJECT: SWG-2013-00229; Lower Colorado River Authority, Preliminary Jurisdictional Determination, Proposed Reservoir, 2,178-Acre Tract, State Highway 60, near Lane City, Wharton County, Texas**

Mr. Henry Eby  
Deputy General Manager  
Lower Colorado River Authority  
P.O. Box 220, Mail Code H107  
Austin, Texas 78767-0220

Dear Mr. Eby:

This letter is in response to your requests, dated March 13 and May 30, 2013, for verification of a jurisdictional delineation on a 2,178-acre tract for the proposed construction of an off-channel reservoir. The project site is located approximately 8,000 feet southwest of the State Highway 60 and Farm-to-Market Road 442 (Lenert Street) intersection, near Lane City, Wharton County, Texas. The Lower Colorado River Authority, during a site visit on July 8, 2013, requested a preliminary jurisdictional determination (PJD) for the verification.

According to Regulatory Guidance Letter 08-02, a landowner, permit applicant or "affected party" may elect to use a PJD in order to move ahead expeditiously to obtain a Corps permit authorization where the party determines that it is in his/her best interest to do so. A permit decision made on the basis of a PJD will treat all waters and wetlands that would be affected in any way by the permitted activity on the site as if they are jurisdictional waters of the United States. In addition, this PJD identifies the approximate locations of the waters on the tract. Based on our July 8, 2013 site visit and subsequent desk reviews of the information associated with this request, we determined that the jurisdictional delineation map received September 23, 2013 (enclosed) is a reasonable depiction of the approximate locations of the waters within the project boundaries. The delineation map shows that the 2,178-acre tract contains 5.15 acres of waters, specifically, 3.81 acres of the Colorado River, 0.81-acre of Jarvis Creek, 0.33-acre of an unnamed tributary to Jarvis Creek, and a 0.2-acre wetland. Computation of impacts made on the basis of this PJD will treat all waters within the project boundary, as if they are jurisdictional waters of the United States. As such, all waters, specifically, the 0.2-acre wetland, the 0.33-acre of the unnamed tributary to Jarvis Creek, the 0.81-acre of Jarvis Creek and the 3.81 acres of the Colorado River appear to be subject to Section 404 of the Clean Water Act (Section 404). Therefore, a Department of the Army (DA) permit is required prior to the discharge of any dredged and/or fill material into those aquatic resources subject to Section 404. Additionally, the



Colorado River is a navigable water of the United States subject to Section 10 of the Rivers and Harbors Act. Therefore, a DA permit is also required prior to conducting work and/or placing structures in the Colorado River.

This determination has been conducted to identify the limits of the Corps' Clean Water Act jurisdiction for the particular site identified in this request. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985, as amended. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

This PJD is valid for 5 years from the date of this letter unless new information warrants a revision prior to the expiration date. An approved jurisdictional determination can be requested at any time. If you have any questions concerning this jurisdictional determination please reference file number **SWG-2013-00229** and contact me at the letterhead address or by telephone at 409-766-3933 or email at [john.davidson@usace.army.mil](mailto:john.davidson@usace.army.mil). To assist us in improving our service to you, please complete the survey found at <http://per2.nwp.usace.army.mil/survey.html> and/or if you would prefer a hard copy of the survey form, please let us know, and one will be mailed to you.

Sincerely,



John Davidson  
Team Lead

Enclosure

Copy Furnished w/ Enclosure:

Jayson Hudson  
CESWG-PE-RB

**NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND  
REQUEST FOR APPEAL**

Applicant: <b>LOWER COLORADO AUTHORITY</b>		File Number: <b>SWG 2013-00229</b>	Date: <b>10/08/2013</b>
Attached is:			See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of Permission)		A
	PROFFERED PERMIT (Standard Permit or Letter of Permission)		B
	PERMIT DENIAL		C
	APPROVED JURISDICTIONAL DETERMINATION		D
<b>X</b>	PRELIMINARY JURISDICTIONAL DETERMINATION		E

**SECTION I -** The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at <http://www.usace.army.mil/inet/functions/cw/cecwo/reg/> Or Corps regulations at 33 CFR Part 331.

**A: INITIAL PROFFERED PERMIT:** You may accept or object to the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

**B: PROFFERED PERMIT:** You may accept or appeal the permit

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**C: PERMIT DENIAL:** You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**D: APPROVED JURISDICTIONAL DETERMINATION:** You may accept or appeal the approved jurisdictional determination (JD) or provide new information.

- **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**E: PRELIMINARY JURISDICTIONAL DETERMINATION:** You do not need to respond to the Corps regarding the preliminary JD. The preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.



**SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT**

**REASONS FOR APPEAL OR OBJECTIONS:** (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

**ADDITIONAL INFORMATION:** The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

**POINT OF CONTACT FOR QUESTIONS OR INFORMATION:**

If you have questions regarding this decision and/or the appeal process you may contact:  
John Davidson  
Compliance Section  
Team Lead  
CESWG-PE-RC  
P.O. Box 1229  
Galveston, Texas 77553-1229  
Telephone: 409-766-3933 FAX: 409-766-6301

If you only have questions regarding the appeal process you may also contact:  
Elliott Carman  
Regulatory Appeals Review Officer  
Southwestern Division USACE (CESWD-PO-O)  
1100 Commerce Street, Suite 831  
Dallas, Texas 75242  
Phone: 469-487-7061 FAX: 469-487-7199

**RIGHT OF ENTRY:** Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or authorized agent.	Date:	Telephone number:
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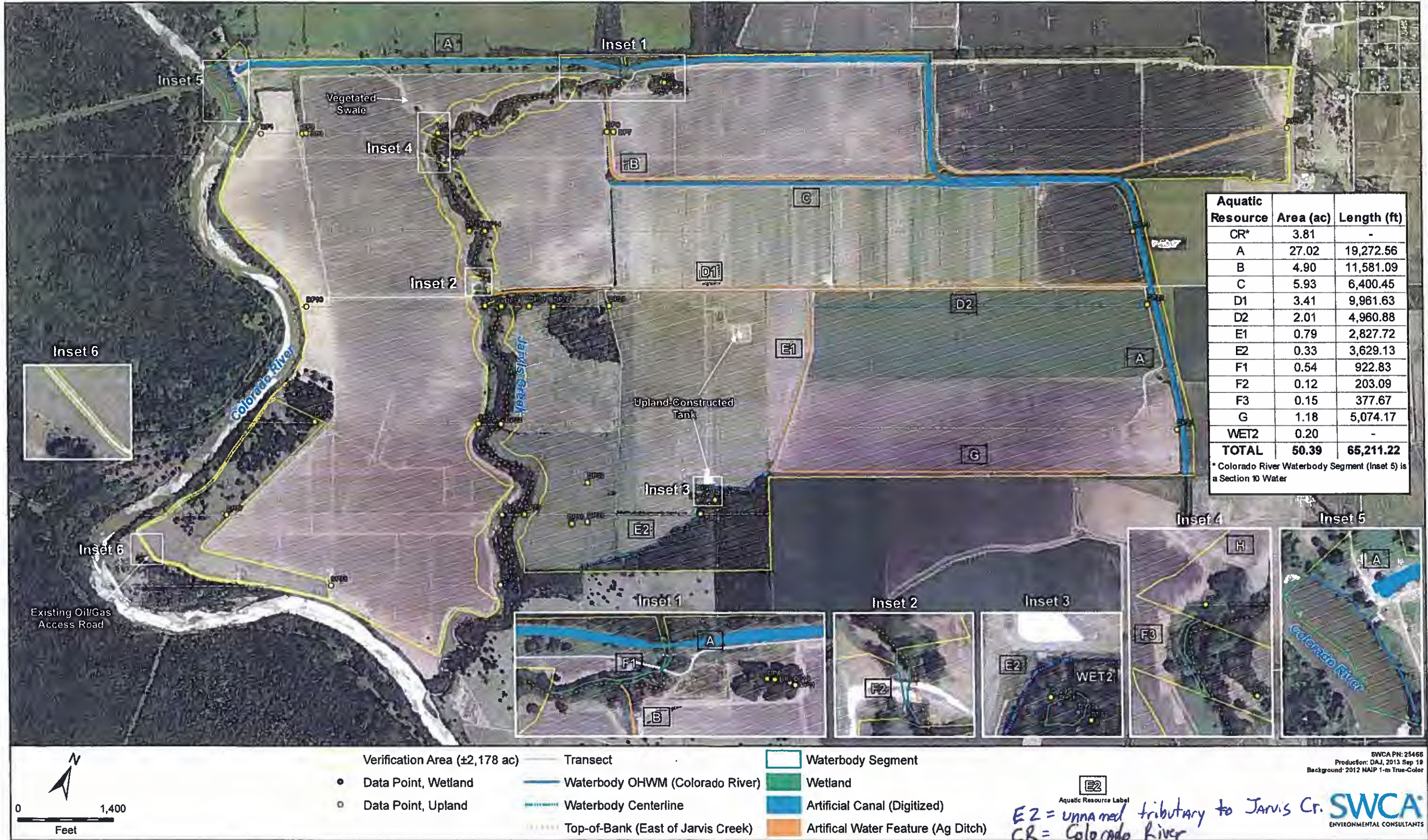


Figure 3. Aquatic Resource Delineation Map, LCRA Lower Basin Reservoir Project



**Attachment 3**  
**Summary of Potential Impacts to Waters of the U.S.**

Attachment 3. Summary of Potential Impacts to Waters of the U.S.

January 29, 2014 Pre-Construction Notice							April 6, 2015 Revised Pre-Construction Notice						
Project Component	Description	Area of Permanent Fill Below OHWM (acres)	Volume of Permanent Fill Below OHWM (cubic yards)	PCN Section & Figures	Water of the U.S.	Proposed NWP and Threshold	Project Component	Description	Area of Permanent Fill Below OHWM (acres)	Volume of Permanent Fill Below OHWM (cubic yards)	PCN Section & Figures	Water of the U.S.	Proposed NWP and Threshold
Pump Station Maintenance				Section 4.1; Attachment 1,	Colorado River	NWP 3, Maintenance (Threshold: none specified)	Pump Station Maintenance				Section 4.1; Attachment 1,	Colorado River	No fill -- repair of existing structures and installation of temporary structure within navigable water; Section 10 authorization only.
Horizontal Pump Station				PCN-006, PCN-007,			Horizontal Pump Station				PCN-006, PCN-007,		
Temporary Access Ramp	Temporary grading above and beyond OHWM	0.0	0.0	PCN-009, PCN-010,			Temporary Access Ramp	Temporary grading above and beyond OHWM	0.0	0.0	PCN-009, PCN-010,		
Temporary Sheet Pile Cofferdam	Temporary structural component below OHWM	0.0	0.0	PCN-011, PCN-028			Temporary Sheet Pile Cofferdam	Optional temporary structural component below OHWM	0.0	0.0	PCN-011		
Suction Pipes and Intake Bells	Remove and replace existing steel pipe below OHWM (no cut or fill below OHWM)	0.0	0.0				Suction Pipes and Intake Bells	Remove and replace aboveground portions of suction pipes and intake bells; line belowground portions of suction pipes (no cut or fill)	0.0	0.0			
Pipe Supports	Remove existing timber pipe supports with steel H-piles and concrete pile caps (no cut or fill below OHWM)	0.0	0.0				Pipe Supports	Replace cross beams on existing timber H-pile supports, existing timber piles to remain (no cut or fill below OHWM)	0.0	0.0			
Vertical Pump Station							Vertical Pump Station						
Temporary Access Ramp	Temporary grading above and beyond OHWM	0.0	0.0				Temporary Access Ramp	Temporary grading above and beyond OHWM	0.0	0.0			
Temporary Sheet Pile Cofferdam	Temporary structural component below OHWM	0.0	0.0				Temporary Sheet Pile Cofferdam	Optional temporary structural component below OHWM	0.0	0.0			
Wet Well Liner & Structural Components	Install new steel and concrete liner and replace corroded structural components (all work within existing structure)	0.0	0.0				Wet Well Liner & Structural Components	Install new steel and concrete liner and replace corroded structural components (all work within existing structure)	0.0	0.0			
<b>Subtotal</b>		<b>0.00</b>	<b>0.0</b>				<b>Subtotal</b>		<b>0.00</b>	<b>0.0</b>			
Pipeline and Outfall Construction				Section 4.2; Attachment 1,	Colorado River	NWP 12, Utility Line Activities (Threshold: 0.5-acre)	Pipeline and Outfall Construction				Section 4.2; Attachment 1,	Colorado River	No fill -- new structure within navigable water; Section 10 authorization only.
Temporary Access Ramp	Temporary grading and fill (approx. 1670 cy) below OHWM	0.0	0.0	PCN-012, PCN-013, PCN-014, PCN-029			Temporary Access Ramp	Temporary grading above and beyond OHWM	0.0	0.0	PCN-012, PCN-013, PCN-014, PCN-015		
Pipe and Outfall							Pipe and Outfall						
Temporary Sheet Pile Cofferdam	Temporary steel sheet pile below OHWM. Portion of sheet pile above tremie concrete slab will be removed upon completion of construction.	0.0	0.0				Temporary Sheet Pile Cofferdam	<b>Eliminated</b> -- Not needed for pipeline and outfall construction. Cofferdams, if any, would only be needed for bank stabilization.	NA	NA			
Temporary Trench	Temporary trench below OHWM to be backfilled with previously-excavated earthen material.	Included in tremie slab & grouted rip rap area	1445.0				Temporary Trench	Temporary trench for pipeline construction above OHWM.	0.0	0.0			
Welded Steel Pipe	65' long, 84" diameter welded steel pipe in trench below OHWM		0.0				Welded Steel Pipe	Approximately 10-foot long vertical section of aboveground 60-inch diameter welded steel outfall pipe is situated within area bounded by the OHWM. Structure only, no fill.	0.0	0.0			
Pipe Bedding & Structural Fill	Fill within 9' x 10' x 65' long pipe trench		124.1				Pipe Bedding & Structural Fill	<b>Eliminated</b> -- no outfall construction below OHWM.	NA	NA			
Concrete Stilling Basin & Pad	Cast-in-Place concrete pad and 15' diameter stilling basin		54.5				Concrete Stilling Basin & Pad	<b>Eliminated.</b> Outfall stilling well is included in bank stabilization.	NA	NA			
Stilling Basin & Pad Structural Fill	One-foot thick structural fill below pad and around all sides of stilling well.		29.2				Stilling Basin & Pad Structural Fill	<b>Eliminated.</b> Outfall stilling well is included in bank stabilization.	NA	NA			
Steel H-piles	Structural steel H-piles installed below stilling basin pad.		0.0				Steel H-piles	<b>Eliminated.</b> Outfall stilling well is included in bank stabilization.	NA	NA			
<b>Subtotal</b>		<b>&lt;0.246<sup>1</sup></b>	<b>1652.8</b>				<b>Subtotal</b>		<b>0.0</b>	<b>0.0</b>			

Attachment 3. Summary of Potential Impacts to Waters of the U.S.

January 29, 2014 Pre-Construction Notice							April 6, 2015 Revised Pre-Construction Notice						
Project Component	Description	Area of Permanent Fill Below OHWM (acres)	Volume of Permanent Fill Below OHWM (cubic yards)	PCN Section & Figures	Water of the U.S.	Proposed NWP and Threshold	Project Component	Description	Area of Permanent Fill Below OHWM (acres)	Volume of Permanent Fill Below OHWM (cubic yards)	PCN Section & Figures	Water of the U.S.	Proposed NWP and Threshold
River Bank Stabilization (700 linear feet of bank) <sup>3</sup>							River Bank Stabilization (435 linear feet of bank) <sup>4</sup>						
				Section 4.2; Attachment 1, PCN-005, PCN-006, PCN-007, PCN-008, PCN-012, PCN-013, PCN-015, PCN-016, PCN-029	Colorado River	NWP 13, Bank Stabilization (Threshold: 500 linear feet of bank; 1 cubic yard of fill per linear foot of bank, avg.)	Outfall Stilling Well (OSW) OSW Steel Structure	Sheet pile sides and interior steel framing (approx. 70 lf of sheet pile). Structure only, no fill.	0.0	0.0	Sections 4.2, 5.1.3; Attachment 1, PCN-005, PCN-012, PCN-013, PCN-014, PCN-015, PCN-016	Colorado River	NWP 13, Bank Stabilization (Threshold: 500 linear feet of bank; 1 cubic yard of fill per linear foot of bank, avg., unless waived by USACE)
Upper Slope Stabilization	Erosion control fabric, re-seeding and container planting above OHWM	0.0	0.0				OSW Tremie Concrete Slab	Concrete fill around OSW (541 sf x (4.0 ft design thickness + 0.25 ft tolerance))	0.012	85.2			
Fabric-Encapsulated Soil Lifts	Fabric-encapsulated soil lifts, crushed rock and geotextile drainage layer, and willow staking above OHWM	0.0	0.0				Upper Slope Stabilization	Erosion control fabric, seeding, brush layers and/or container planting above OHWM	0.0	0.0			
Grouted Rip Rap	Grouted rip rap fill below OHWM (1550 sf x 2'	0.036	114.8				Fabric-Encapsulated Soil Lifts	Fabric-encapsulated soil lifts, brush layers, and live staking above OHWM	0.0	0.0			
Rip Rap Bedding	Crushed rock and geotextile filter zone below grouted rip rap (1550 sf x 1' thick)	Included in grouted rip rap area	57.4				Grouted Rip Rap	<b>Eliminated</b>	NA	NA			
Sheet Pile	Steel sheet pile (approx. 405 lf) below OHWM. Portion of sheet pile above tremie concrete slab will be removed upon completion of project.	0.0	0.0				Rip Rap Bedding	<b>Eliminated</b>	NA	NA			
							Sheet Pile	Steel sheet pile (permanent) -- approx. 237 lf along the bank and 188 lf around the perimeter of the tremie concrete slab. Temporary -- Portion of sheet pile above tremie concrete slab will be removed upon completion of project. Structure only, no fill.	0.0	0.0			
							Fill Between Bank and Sheet Pile Wall	Granular, earthen and/or rip rap fill between bank and sheetpile wall (1016 sf)	0.02	91.5			
Tremie Concrete Slab	Concrete fill around stilling basin (9180 sf x 1.5' thick)	0.211	510.0				Tremie Concrete Slab	Concrete fill around OSW (3846 sf x (2.00 design thickness + 0.25' tolerance))	0.09	320.5			
Subgrade Preparation for Tremie Concrete Slab	Excavaton within area enclosed by steel sheet pile, no fill.	Included in tremie slab area	0.0				Subgrade Preparation for Tremie Concrete Slab	Excavaton within area enclosed by steel sheet pile, no fill.	included in tremie concrete slab area	0.0			
							Articulating Concrete Block Mat (ACM)	ACM installed on natural grade around perimeter of tremie concrete slab (1561 sf x 1' thick)	0.04	57.8			
<b>Subtotal</b>		<b>0.246</b>	<b>682.2</b>				<b>Subtotal</b>		<b>0.16</b>	<b>555.0</b>			
<b>Volume of Fill per Linear Foot of Bank (682.2 cy/700 lf)</b>			<b>0.97</b>				<b>Volume of Fill per Linear Foot of Bank (555 cy/435 lf)</b>			<b>1.28</b>			
Canal Flume Replacement							Canal Flume Replacement						
Temporary Trench	Temporary trench for construction of one pier wall below OHWM, to be backfilled with previously excavated earthen material -- 15' x 3' x 45'	0.015	75.0	Section 4.4; Attachment 1, PCN-017, PCN-019	Jarvis Creek	NWP 3, Maintenance (Threshold: none specified)	Temporary Trench	Temporary trench for construction of one pier wall below OHWM, to be backfilled with previously excavated earthen material -- 968 sf	0.022	68.9	Section 4.4; Attachment 1, PCN-017, PCN-019, PCN-021	Jarvis Creek	NWP 3, Maintenance (Threshold: none specified)
Steel H-piles	Belowground structural component below OHWM (25 ft min embedment)	0.0	0.0				Steel Pipe Piles	Belowground steel pipe piles below OHWM, 25 ft min embedment. Structural component, no fill.	0.0	0.0			
Concrete H-pile Caps	One poured-in-place concrete cap belowgrade & below OHWM -- 6' x 39' x 2.5'	Included in trench area	21.7				Concrete Pile Caps	One poured-in-place concrete cap belowgrade & below OHWM -- 7' x 33' x 3'	Included in trench area	25.7			
Concrete Pier Walls	One cast-in-place concrete pier wall -- 3' x 39' x 4' below OHWM	Included in trench area	17.3				Concrete Pier Walls	One cast-in-place concrete pier wall -- 2' x 31' x 5.5' below OHWM	Included in trench area	12.6			
Concrete Abutment Walls	Remove, regrade and revegetate as needed for new flume construction -- Above and beyond OHWM	NA	NA				Concrete Abutment Walls	Remove abutment walls -- Above and beyond OHWM	NA	NA			
<b>Subtotal</b>		<b>0.015</b>	<b>114.0</b>				<b>Subtotal</b>		<b>0.022</b>	<b>107.2</b>			

Attachment 3. Summary of Potential Impacts to Waters of the U.S.

January 29, 2014 Pre-Construction Notice							April 6, 2015 Revised Pre-Construction Notice											
Project Component	Description	Area of Permanent Fill Below OHWM (acres)	Volume of Permanent Fill Below OHWM (cubic yards)	PCN Section & Figures	Water of the U.S.	Proposed NWP and Threshold	Project Component	Description	Area of Permanent Fill Below OHWM (acres)	Volume of Permanent Fill Below OHWM (cubic yards)	PCN Section & Figures	Water of the U.S.	Proposed NWP and Threshold					
Low-Water Crossing/Bridge Replacement and Channel Restoration at County Road 120							Low-Water Crossing/Bridge Replacement											
Existing Timber Bridge	Removed existing timber bridge -- belowground portion of piers will be abandoned in place, no new fill or structures.	0.0	0.0	Section 4.5; Attachment 1, PCN-017, PCN-018, PCN-020, PCN-021, PCN-024, PCN-025	Jarvis Creek	NWP 14, Linear Transportation Projects (Threshold: 0.5-acre)	Existing Timber Bridge	Removed existing timber bridge -- belowground portion of piers will be abandoned in place if piers cannot be removed without disturbing creek bed, no new fill or structures.	0.0	0.0	Section 4.5; Attachment 1, PCN-017, PCN-018, PCN-020, PCN-021	Jarvis Creek	NWP 14, Linear Transportation Projects (Threshold: 0.5-acre)					
New Concrete Bridge																		
Temporary Trench	Temporary trench for construction of one pier wall below OHWM, to be backfilled with previously excavated earthen material -- 3' x 3' x 30'	0.004	10.0				New Concrete Bridge Temporary Trench	Portions of temporary trenches for construction of two pier walls within the boundaries of the OHWM (approx. 1169.2 SF), to be backfilled with previously excavated earthen material.	0.027	145.8								
Steel H-piles	Belowground structural component below OHWM (25 ft min embedment)	0.0	0.0				Steel Pipe Piles	Five 16"-diameter steel pipe piles within bounds of OHW (25 ft min embedment); belowground structural component, no fill	0.0	0.0								
Concrete H-pile Caps	Portion of one poured-in-place concrete cap belowgrade and below OHWM -- 2.5' x 2' x 26'	Included in trench area	4.8				Concrete Pile Caps	Approx. half of one poured-in-place concrete cap belowgrade and below OHWM -- 2.5' x 5' x 31'	Included in trench area	14.4								
Concrete Pier Walls	Cast-in-place concrete pier walls, above & beyond OHWM	0.0	0.0				Concrete Pier Walls	Approx. half of one cast-in-place concrete pier wall within the area bounded by OHW -- 0.5 x 2.5' x 28.6' x 6' tall	Included in trench area	7.9								
Concrete Abutment Walls	Remove, regrade and revegetate as needed for new bridge construction -- Above and beyond OHWM	0.0	0.0				Concrete Abutment Walls	Modular concrete block retaining walls and backfill above and beyond OHWM.	0.0	0.0								
Temporary Haul Road	Extend steel culvert at existing low-water crossing and fill to construct temporary haul road. Culvert and road to be removed upon completion of construction.	0.0	0.0				Temporary Haul Road	Extend steel culvert approx. 15' at existing low-water crossing and fill to construct temporary haul road. Culvert and road to be removed upon completion of construction (approx. 150 cy of temp fill).	0.0	0.0								
Low Water Crossing and Channel Restoration							Low Water Crossing											
Low Water Crossing	Excavate existing fill, remove culvert, cut channel to match natural creek cross-section, no new fill.	0.0	0.0				Low Water Crossing	Excavate existing fill and remove culvert to match natural creek cross-section. Bank stabilization and related fill addressed below.	0.0	0.0								
Upper Slope Stabilization	Erosion control fabric and revegetation above OHWM	0.0	0.0	Upper Slope Stabilization	<b>Eliminated</b> -- Addressed in Bank Stabilization/Channel Restoration below.	NA	NA											
Fabric-Encapsulated Soil Lifts	Portion of FESL within OHWM (Three 1' thick x 8' wide x 15' long lifts)	0.027	13.3	Fabric-Encapsulated Soil Lifts		NA	NA											
Rip Rap Grade Control Structure	8' x 5' x 24' belowgrade structure within OHWM	0.004	35.6	Rip Rap Grade Control Structure		NA	NA											
<b>Subtotal</b>		<b>0.035</b>	<b>63.7</b>				<b>Subtotal</b>		<b>0.027</b>	<b>168.1</b>								



Attachment 3. Summary of Potential Impacts to Waters of the U.S.

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Project Component	Description	Area of Permanent Fill Below OHWM (acres)	Volume of Permanent Fill Below OHWM (cubic yards)	PCN Section & Figures	Water of the U.S.	Proposed NWP and Threshold	Project Component	Description	Area of Permanent Fill Below OHWM (acres)	Volume of Permanent Fill Below OHWM (cubic yards)	PCN Section & Figures	Water of the U.S.	Proposed NWP and Threshold	
							Bank Stabilization/Channel Restoration at Jarvis Creek near Pump Station Road (240 linear feet of bank) <sup>5</sup>							
							Upper Slope Stabilization	Erosion control fabric, seeding, brush layers, container planting, and/or FESL above OHWM. No fill.	0.0	0.0	Sections 4.4, 4.5, 5.1.3; Attachment 1, PCN-021, PCN-024, PCN-025, PCN-030	Jarvis Creek	NWP 13, Bank Stabilization (Threshold: 500 linear feet of bank; 1 cubic yard of fill per linear foot of bank, avg.)	
						Fabric-Encapsulated Soil Lifts w/ OHWM	Portion of FESL within OHWM (105 sf)	0.002	2.7					
						Grade Control Structure	Rock or concrete rip rap grade control structure (8' x 5' x 24' belowgrade structure within OHWM)	0.004	35.6					
						Permanent Earthen Fill	Grading within creek bed to establish channel profile following removal of low water crossing (approx. 1' avg depth in 616 sf area)	0.014	22.8					
							<b>Subtotal</b>		<b>0.021</b>	<b>61.1</b>				
							<b>Volume of Fill per Linear Foot of Stream Reach (61.1 cy/240 lf)</b>			<b>0.3</b>				
Temporary Haul Road and Channel Restoration at CR 116 & Jarvis Creek				Section 4.6; Attachment 1, PCN-022, PCN-023, PCN-024, PCN-025	Jarvis Creek	NWP 33, Temporary Construction, Access & Dewatering (Threshold: none specified)	Temporary Haul Road at McGowan Rd & Jarvis Creek				Section 4.6; Attachment 1, PCN-022	Jarvis Creek	NWP 33, Temporary Construction, Access & Dewatering (Threshold: none specified)	
Temporary Haul Road	Extend steel culvert at existing low-water crossing and fill to construct temporary haul road. Culvert and road to be removed upon completion of construction.	0.0	0.0				Temporary Haul Road	Optional: Extend steel culvert approx. 35 feet at existing low-water crossing and fill to construct temporary haul road (approx. 250 cy of temp fill). Culvert and temp fill to be removed upon completion of construction. No permanent fill.	0.0	0.0				
							<b>Subtotal</b>		<b>0.0</b>	<b>0.0</b>				
Low Water Crossing and Channel Restoration							Low-Water Crossing Removal & Bank Stabilization/Channel Restoration at McGowan Road & Jarvis Creek (120 linear feet of bank) <sup>6</sup>					Sections 4.6, 5.1.3; Attachment 1, PCN-023, PCN-024, PCN-025	Jarvis Creek	NWP 13, Bank Stabilization (Threshold: 500 linear feet of bank; 1 cubic yard of fill per linear foot of bank, avg.)
Existing Low Water Crossing	Excavate existing fill, remove culvert, cut channel to match natural creek cross-section, no new fill.	0.0	0.0				Existing Low Water Crossing	Excavate existing fill, remove culvert, cut channel to match natural creek cross-section, no new fill.	0.0	0.0				
Upper Slope Stabilization	Erosion control fabric and revegetation above OHWM	0.0	0.0				Upper Slope Stabilization	Erosion control fabric, seeding, brush layers, container planting, and/or FESL above OHWM. No fill.	0.0	0.0				
Fabric-Encapsulated Soil Lifts	Portion of FESL within OHWM (Three 1' thick x 8' wide x 95' lf)	0.047	84.4				Fabric-Encapsulated Soil Lifts	Portion of FESL within OHWM (624 sf)	0.014	22.8				
Rip Rap Grade Control Structure	8' x 5' x 24' belowgrade structure within OHWM	0.004	35.6				Rip Rap Grade Control Structure	Rock or concrete rip rap grade control structure (8' x 5' x 24' belowgrade structure within OHWM)	0.004	35.6				
<b>Subtotal</b>		<b>0.051</b>	<b>120.0</b>				<b>Subtotal</b>		<b>0.019</b>	<b>58.4</b>				
							<b>Volume of Fill per Linear Foot of Stream Reach (58.4 cy/120 lf)</b>			<b>0.49</b>				

**Attachment 3. Summary of Potential Impacts to Waters of the U.S.**

January 29, 2014 Pre-Construction Notice							April 6, 2015 Revised Pre-Construction Notice						
Project Component	Description	Area of Permanent Fill Below OHWM (acres)	Volume of Permanent Fill Below OHWM (cubic yards)	PCN Section & Figures	Water of the U.S.	Proposed NWP and Threshold	Project Component	Description	Area of Permanent Fill Below OHWM (acres)	Volume of Permanent Fill Below OHWM (cubic yards)	PCN Section & Figures	Water of the U.S.	Proposed NWP and Threshold
Off-Channel Reservoir Embankment, Perimeter Road, and Storm Water Ditch Outfall at Unnamed Tributary to Jarvis Creek							Off-Channel Reservoir Embankment, Perimeter Road, and Storm Water Ditch Outfall at Unnamed Tributary to Jarvis Creek						
Earthen Embankment and Perimeter Road	Earthen fill below OHWM within 120 linear feet of tributary <sup>2</sup>	0.011	7.4	Section 4.7; Attachment 1, PCN-004, PCN-026	Unnamed Tributary to Jarvis Creek	NWP 18, Minor Discharges (Threshold: 0.1 acre; 25 cy)	Earthen Embankment and Perimeter Road	Earthen fill below OHWM within 100 linear feet of tributary <sup>2</sup> (412 sf, 1' avg depth)	0.009	15.3	Section 4.7; Attachment 1, PCN-004, PCN-026	Unnamed Tributary to Jarvis Creek	NWP 18, Minor Discharges (Threshold: 0.1 acre; 25 cy)
Concrete Culvert Apron	Cast-in-place concrete apron for 3-18" diameter culverts	Included in earthen fill area	1.5				Concrete Culvert Apron	<b>Eliminated.</b>	NA	NA			
							Fabric-Encapsulated Soil Lifts	Portion of FESL within OHWM (82 sf)	0.002	2.3			
<b>Subtotal</b>		<b>0.011</b>	<b>8.9</b>				<b>Subtotal</b>		<b>0.011</b>	<b>17.6</b>			
<b>Cumulative Area of Fill: 0.359 Acre</b>							<b>0.260 Acre</b>						

<sup>1</sup>Area below Ordinary High Water Mark (OHWM) in Colorado River that will be temporarily excavated and backfilled to accommodate installation of water pipeline and outfall structure is co-located with tremie concrete slab and grouted rip rap that will be installed for bank stabilization. Therefore, the 0.246-acre area identified for each component is only included in the cumulative total fill area for the project once.

<sup>2</sup>Area below OHWM estimated using approximate one-foot depth of ordinary high water and channel topographic data.

<sup>3</sup>Length of bank extending from upstream of the Horizontal Pump Station to the downstream end of the temporary construction ramp.

<sup>4</sup>Length of bank extending from upstream of the Horizontal Pump Station to the downstream end of the sheetpile wall at the river outfall.

<sup>5</sup>Length of bank extending from upstream of the canal flume over Jarvis Creek to the downstream end of the proposed fabric-encapsulated soil lifts.

<sup>6</sup>Length of bank extending from upstream of the existing low water crossing to the downstream end of the existing fill in Jarvis Creek.

**Attachment 4**  
**Jarvis Creek Stream Condition Assessment**



**SWCA**<sup>®</sup>

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Sound Science. Creative Solutions.<sup>®</sup>

**USACE Galveston District Level 1 Stream  
Condition Assessment for Jarvis Creek:  
Lane City Reservoir Project, Wharton  
County, Texas**

**USACE Permit SWG-2013-00229**

Prepared for  
**Lower Colorado River Authority**

Prepared by  
**SWCA Environmental Consultants**

March 2015  
SWCA Project Number 25466-AUS



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**USACE GALVESTON DISTRICT LEVEL 1 STREAM CONDITION ASSESSMENT FOR  
JARVIS CREEK: LANE CITY RESERVOIR PROJECT, WHARTON COUNTY, TEXAS  
USACE PERMIT SWG-2013-00229**

Prepared for

**LOWER COLORADO RIVER AUTHORITY**  
3700 Lake Austin Blvd.  
Austin, Texas 78703

Prepared by

**SWCA ENVIRONMENTAL CONSULTANTS**  
4407 Monterey Oaks Boulevard  
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[www.swca.com](http://www.swca.com)

SWCA Project Number 25466-AUS

23 March 2015



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## 1.0 INTRODUCTION

On behalf of the Lower Colorado River Authority (LCRA), SWCA Environmental Consultants (SWCA) performed a U.S. Army Corps of Engineers (USACE) Level 1 Stream Condition Assessment (SCA) on an ephemeral segment of Jarvis Creek for proposed construction and stream restoration activities associated with the 1,125-acre Lane City Reservoir Project (Proposed Project),<sup>1</sup> that is located approximately 0.6 miles southwest of Lane City in Wharton County along the Colorado River (Figure 1).

In support of USACE Clean Water Act (CWA) Permit SWG-2013-00229, the purpose of the SCA is to document that planned improvement projects within an approximately 250-foot reach of Jarvis Creek will cause no significant adverse impact. Planned improvements as outlined in the CWA permit documents include a canal flume replacement, timber bridge removal and new bridge construction, and a low water crossing and culvert removal. The USACE instructed LCRA to assess the existing and projected stream condition of the Stream Assessment Reach (SAR) depicted in Figures 1 and 2. SAR Transect 2 is the subject reach.

### 1.1 Methods

SWCA assessed the existing conditions on 9 March 2015 per the USACE Galveston District Standard Operating Procedures along three SAR transects (Figure 2). SWCA did not have access permission to SAR Transect 1, the upstream transect that is outside the Proposed Project property. Per Jayson Hudson (USACE Galveston District via email data February 17, 2015), SWCA assessed SAR Transect 1 visually from the property boundary and from desktop resources.

Due to the amount of rainfall that occurred within the 48 hours prior to the site visit (approximately 2-3 inches), SWCA also used information available from CWA permit submittals and from prior site visits, including photographs, to supplement the SCA (Attachment A contains the Level 1 Data Forms). Appendix B includes photographs from prior site visits, as well as photographs depicting the conditions during the SCA.

### 1.2 Results

#### 1.2.1 Current Condition Reach Condition Index (RCI)

Table 1 summarizes the current condition visual parameters for each SAR, the individual SAR Reach Condition Index (RCI), and the SAR averages. Attachments A and B include the Level 1 Data Forms and representative photographs, respectively. Jarvis Creek does not have a Texas Commission on Environmental Quality surface water quality health assessment, thus the Aquatic Use score defaults to 1.

Table 1. Stream Assessment Reach Current Condition Summary

SAR	Channel Condition	Riparian Buffer	Aquatic Use	Channel Alteration	RCI
SAR 1	3	4.25	1	4	3.06
SAR 2	2.5	2.59	1	2	2.02

<sup>1</sup> Formerly “Lower Basin Reservoir Project”

SAR 3	2.5	3.55	1	3	2.51
<b>Average</b>	<b>2.67</b>	<b>3.46</b>	<b>1</b>	<b>2.67</b>	<b>2.53</b>

### 1.2.2 Delta Condition Reach Condition Index (RCI)

Table 2 summarizes the delta condition, or projected post-project condition, visual parameters for each SAR, the individual SAR Reach Condition Index (RCI), and the SAR averages. For SAR 2, Channel Condition and Channel Alteration scores are projected to increase. Although not depicted as so in Table 2, SAR 3 Channel Condition is expected to improve over time once the upstream improvements are completed.

Table 2. Stream Assessment Reach Delta Condition Summary

SAR	Channel Condition	Riparian Buffer	Aquatic Use	Channel Alteration	RCI
SAR 1	3	4.25	1	4	3.06
SAR 2	3	2.59	1	3	2.40
SAR 3	2.5	3.55	1	3	2.51
<b>Average</b>	<b>2.83</b>	<b>3.46</b>	<b>1</b>	<b>3</b>	<b>2.66</b>

## 1.3 Conclusion and Compensation Requirement (CR)

Based on the results of the SCA, the planned project improvements will be self-mitigating, provide for some ecological lift in stream function (Table 3), and require no additional compensatory mitigation. Table 3 and the Stream Assessment Summary Form (Attachment A) compare the Current and Delta Condition RCIs based off the RCIs for each SAR (Attachment A). SWCA applied an Impact Factor of 1 for each condition as impacts are temporary, the site will be returned to pre-construction or better conditions, and there is no permanent or net loss of aquatic resource function.

Table 3. Stream Assessment Reach Compensation

Condition	Average RCI	Linear Feet of Impact	Compensation Credits
Current	2.53	250	633.50
Delta	2.66	250	664.17
<b>Total</b>			<b>+31.67</b>







**Figure 2.** Location of Stream Assessment Reach Transects

## 2.0 REFERENCES

- Lower Colorado River Authority (LCRA). 2015. Lane City Reservoir Project Fact Sheet. Available online at: <http://www.lcra.org/water/water-supply/drought-update/Documents/Fact-Sheet-New-Reservoir.pdf>. Accessed 13 March 2015.
- \_\_\_\_\_. 2014. Pre-Construction Notification for Nationwide Permit Authorization: LCRA Lower Basin Reservoir Project at Lane City, Wharton County, Texas. Dated 29 January 2014.
- U.S. Army Corps of Engineers (USACE). 2013. USACE Galveston District Stream Condition Assessment. Available online at: <http://www.swg.usace.army.mil/Portals/26/docs/regulatory/Streams/Stream%20Assessment%20June%202013.pdf>. Accessed 3 March 2015.

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## **APPENDIX A**

### **Level 1 Stream Condition Assessment Data Forms**

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**STREAM ASSESSMENT SUMMARY FORM**

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**CURRENT CONDITION**

**LEVEL 1 STREAM ASSESSMENT DATA FORM**

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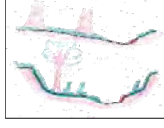



# Stream Assessment Data Form for Level 1

U.S. Army Corps of Engineers Galveston District

File Number	Applicant	Stahler Stream Order	8 Digit HUC	Date	Transect #	Transect Description
SWG-2013-00229	LCRA	2	12090302	3/9/2015	SAR 1	Current Condition

Name(s) of Evaluator(s)	Stream Name and Type
David Long	Jarvis Creek/Ephemeral

**1. Channel Condition:** Assess the cross-section of the stream and prevailing condition (erosion, aggradation).

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>Visual Channel Condition Parameter</b>						
	Channel shows very little incision or widening and little or no evidence of erosion or unprotected banks. Indicators of stability include greater than 80% vegetative cover on the banks, stable point bars and bankfull benches may be present, mid-channel and transverse bars are rare or transient. The stream has access to active floodplain or fully developed bankfull benches. No bulkheading or riprap may be present.	Channel is slightly incised and contains a few areas of active erosion. Indicators of instability include vegetative cover or natural rock protection only present along 60-80% of the Transect, point bars and bankfull benches are likely present and transient sediment is present along 10-40% of the stream bottom. The stream has access to bankfull benches or developed floodplains along portions of the reach. Channel may show evidence of past channel alteration, but should be exhibiting notable recovery of a natural channel. Bulkhead and riprap are limited to 1-25% of the Transect.	Channel is incised or has had its course widened. Indicators of instability include the presence of erosional scars on 40-60% of the Transect, vegetative cover or natural rock only found on 40-60% of the Transect, vertical or undercut banks, or nickpoints associated with headcuts may be present and portions of the channel may be widening while other portions of the channel are narrowing, and transient sediments are found in 40-60% of the natural stream bed or bottom. The stream does not have access to the active floodplain. Bulkheading or riprap is found along 25-50% of the Transect.	Channel is over-widened or incised with vertically or laterally unstable banks. Visual indicators of over-widening and incision include near vertical banks with shallow root depths, erosional scars present along 60-80% of the Transect, vegetative cover or natural rock is limited to 20-40% of the Transect, substantial sediment deposition of uniformed-size material is present along 60-80% of the Transect and point bars and bankfull benches are absent. The stream does not have access to an active floodplain. Bulkheading and riprap are present along 50-80% of the Transect.	Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Indicators of instability include the streambed elevation located below the rooting depth, both banks are vertical or undercut, vegetative surface protection or natural rock is only found along 20% or less of the Transect, the bank is sloughing and erosional scars or raw banks present on 80-100% of the Transect and 80% or more of the natural streambed is covered by substantial sediment resulting in threaded channels. The stream does not have access to an active floodplain.	<b>CV</b>
<b>Score</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>3.0</b>

**Notes:** Stream channel has been historically widened/dredged. Erosion is located on the right bank facing downstream but the channel shows signs of recovery.

**2. RIPARIAN BUFFERS:** Assess both banks' 100-foot riparian areas along the entire Transect.

	Optimal	Suboptimal	Marginal	Poor	Severe		
<b>Riparian Buffers</b>	Native woody species represent greater than 60% of the coverage and wetlands are present.	Native woody community species represent greater than 60% coverage with NO wetlands present within the buffer OR native woody community species represent 30-60% coverage with wetlands present. No maintenance or grazing activities.	Native woody community species represent between 30-60% coverage with NO wetlands present. No maintenance or grazing activities.	Native woody community represents less than 30% coverage with no maintenance or grazing activities.	The buffer is dominated by one or more of the following: lawns, mowed or maintained right-of-way, no-till cropland, actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized or other comparable condition.	The area is dominated by impervious surfaces, mine spoil lands, denuded surfaces, conventional tillage row crops, active feed lots or comparable conditions.	
<b>Condition Scores</b>	<b>5</b>	<b>High = 4.5</b> <b>Low = 4</b>	<b>3</b>	<b>2</b>	<b>1</b>		

**Notes:** Limited access to SAR Transect 1. Approximately 50% of the riparian buffer < 100' from stream is dominated by woody species (e.g. *Quercus sp.*, *Acer negundo*, *Morus rubra*, *Carya illinoensis*, *Vitis sp.*, *Fraxinus sp.*).

<b>Right Bank</b>	% Riparian Area >	<b>50%</b>	<b>40%</b>	<b>10%</b>		<b>100%</b>	
	Score >	<b>4.5</b>	<b>4</b>	<b>3</b>			
<b>Left Bank</b>	% Riparian Area >	<b>90%</b>	<b>10%</b>			<b>100%</b>	<b>Rt Bank CI &gt; 4.15</b>
	Score >	<b>4.5</b>	<b>3</b>				<b>Lt Bank CI &gt; 4.35</b>

**3. AQUATIC USE:** The Transect is assessed based on the aquatic life use category score assigned to the stream segment by the TCEQ.

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>AQUATIC USE</b>	Aquatic Life Score of Exceptional.	Aquatic Life Score of High. Perennial streams that have not been assessed are also assumed to have an Aquatic Life Score of High.	Aquatic Life Score of Intermediate.	Aquatic Life Score of Limited. Intermittent Streams with Perennial Pools that have not been assessed are also assumed to have an Aquatic Life Score of Limited.	Aquatic Life Score of Minimal. Intermittent and ephemeral streams that have not been assessed are also assumed to have an Aquatic Life Score of Minimal.	
<b>Score</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>UV</b>
						<b>1.00</b>

**Notes:** Jarvis Creek does not have a Texas Commission on Environmental Quality surface water quality health assessment, thus the Aquatic Use score defaults to 1.



## Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Transect #	Transect Description
	LCRA	Lane City, TX	R4	12090302	3/9/2015	SAR1	Current Condition

**4. CHANNEL ALTERATION:** Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>Channel Alteration</b>	Channelization, dredging, alteration or hardening absent. Stream has unaltered pattern or has normalized. No dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures within the Transect.	Less than 30% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration may be present, but stream pattern and stability have recovered. Withdrawals, if present, have no observable affect on flow.	Between 30-60% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration may be present, but stream pattern and stability are beginning to recover. Withdrawals, if present, may have an observable affect on flow, but no observable affect on habitat or biota.	Between 60-90% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration is present, and stream pattern and stability are not recovering. Withdrawals, if present, may have an observable affect on both flow and habitat or biota.	Between 90-100% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Withdrawals, if present, are large enough to have severe loss of flow and cause little to no habitat or biota.	<b>AV</b>
<b>SCORE</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>4.00</b>

**Notes:** The majority of this SAR transect has recovered from previous channel alterations.

**REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH**

	<b>THE CONDITION INDEX (CI) &gt;&gt; 3.06</b>
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**INSERT PHOTOS:** See Appendix B Photographic Log


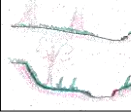



# Stream Assessment Data Form for Level 1

U.S. Army Corps of Engineers Galveston District

File Number	Applicant	Stahler Stream Order	8 Digit HUC	Date	Transect #	Transect Description
SWG-2013-00229	LCRA	2	12090302	3/9/2015	SAR 2	Current Condition

Name(s) of Evaluator(s)	Stream Name and Type
David Long	Jarvis Creek/Ephemeral

**1. Channel Condition:** Assess the cross-section of the stream and prevailing condition (erosion, aggradation).

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>Visual Channel Condition Parameter</b>						
	Channel shows very little incision or widening and little or no evidence of erosion or unprotected banks. Indicators of stability include greater than 80% vegetative cover on the banks, stable point bars and bankfull benches may be present, mid-channel and transverse bars are rare or transient. The stream has access to active floodplain or fully developed bankfull benches. No bulkheading or riprap may be present.	Channel is slightly incised and contains a few areas of active erosion. Indicators of instability include vegetative cover or natural rock protection only present along 60-80% of the Transect, point bars and bankfull benches are likely present and transient sediment is present along 10-40% of the stream bottom. The stream has access to bankfull benches or developed floodplains along portions of the reach. Channel may show evidence of past channel alteration, but should be exhibiting notable recovery of a natural channel. Bulkhead and riprap are limited to 1-25% of the Transect.	Channel is incised or has had its course widened. Indicators of instability include the presence of erosional scars on 40-60% of the Transect, vegetative cover or natural rock only found on 40-60% of the Transect, vertical or undercut banks, or nickpoints associated with headcuts may be present and portions of the channel may be widening while other portions of the channel are narrowing, and transient sediments are found in 40-60% of the natural stream bed or bottom. The stream does not have access to the active floodplain. Bulkheading or riprap is found along 25-50% of the Transect.	Channel is over-widened or incised with vertically or laterally unstable banks. Visual indicators of over-widening and incision include near vertical banks with shallow root depths, erosional scars present along 60-80% of the Transect, vegetative cover or natural rock is limited to 20-40% of the Transect, substantial sediment deposition of uniformed-size material is present along 60-80% of the Transect and point bars and bankfull benches are absent. The stream does not have access to an active floodplain. Bulkheading and riprap are present along 50-80% of the Transect.	Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Indicators of instability include the streambed elevation located below the rooting depth, both banks are vertical or undercut, vegetative surface protection or natural rock is only found along 20% or less of the Transect, the bank is sloughing and erosional scars or raw banks present on 80-100% of the Transect and 80% or more of the natural streambed is covered by substantial sediment resulting in threaded channels. The stream does not have access to an active floodplain.	<b>Score</b>
	5	4	3	2	1	<b>CV</b> 2.5

**Notes:** Channel has been historically widened/dredged and within this reach is a canal flume, an abandoned timber bridge, and a culverted low-water concrete crossing. The flume and the timber bridge have in-channel support structures. The existing crossing design does not support adequate channel flow and as a result it has created a heavily eroded "plunge pool" at the outfall. In general, this reach exhibits greater erosions and vertical banks.

**2. RIPARIAN BUFFERS:** Assess both banks' 100-foot riparian areas along the entire Transect.

	Optimal	Suboptimal	Marginal	Poor	Severe		
<b>Riparian Buffers</b>	Native woody species represent greater than 60% of the coverage and wetlands are present.	Native woody community species represent greater than 60% coverage with NO wetlands present within the buffer OR native woody community species represent 30-60% coverage with wetlands present. No maintenance or grazing activities.	Native woody community species represent between 30-60% coverage with NO wetlands present. No maintenance or grazing activities.	Native woody community represents less than 30% coverage with no maintenance or grazing activities.	The buffer is dominated by one or more of the following: lawns, mowed or maintained right-of-way, no-till cropland, actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized or other comparable condition.	The area is dominated by impervious surfaces, mine spoil lands, denuded surfaces, conventional tillage row crops, active feed lots or comparable conditions.	
<b>Condition Scores</b>	5	High = 4.5 Low = 4	3	2	1		

**Notes:** The north side of SAR Transect 2 is dominated by cultivation, roadways, and maintained roadsides. Roughly 30% of the riparian buffer is dominated by similar woody species as SAR Transect 1 (e.g. *Quercus sp.*, *Acer negundo*, *Morus rubra*, *Carya illinoensis*, *Vitis sp.*). The native woody component of the riparian buffer within SAR Transect 2 is more narrow (~50') than SAR Transect 1 and is adjacent to row-crop cultivation.

<b>Right Bank</b>	% Riparian Area >	25%	10%	50%	15%	100%	
	Score >	1.5	1	3	2.5	1	
<b>Left Bank</b>	% Riparian Area >	25%	10%	40%	25%	100%	
	Score >	1.5	1	4	3	1	Rt Bank CI > 2.35 Lt Bank CI > 2.83

**3. AQUATIC USE:** The Transect is assessed based on the aquatic life use category score assigned to the stream segment by the TCEQ.

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>AQUATIC USE</b>	Aquatic Life Score of Exceptional.	Aquatic Life Score of High. Perennial streams that have not been assessed are also assumed to have an Aquatic Life Score of High.	Aquatic Life Score of Intermediate.	Aquatic Life Score of Limited. Intermittent Streams with Perennial Pools that have not been assessed are also assumed to have an Aquatic Life Score of Limited.	Aquatic Life Score of Minimal. Intermittent and ephemeral streams that have not been assessed are also assumed to have an Aquatic Life Score of Minimal.	
<b>Score</b>	5	4	3	2	1	<b>UV</b> 1.00

**Notes:** Jarvis Creek does not have a Texas Commission on Environmental Quality surface water quality health assessment, thus the Aquatic Use score defaults to 1.

## Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Transect #	Transect Description
	LCRA	Lane City, TX	R4	12090302	3/9/2015	SAR2	Current Condition
<b>4. CHANNEL ALTERATION:</b> Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock							
<b>Channel Alteration</b>	<b>Optimal</b>	<b>Suboptimal</b>	<b>Marginal</b>	<b>Poor</b>	<b>Severe</b>		
	Channelization, dredging, alteration or hardening absent. Stream has unaltered pattern or has normalized. No dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures within the Transect.	Less than 30% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration may be present, but stream pattern and stability have recovered. Withdrawals, if present, have no observable affect on flow.	Between 30-60% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration may be present, but stream pattern and stability are beginning to recover. Withdrawals, if present, may have an observable affect on flow, but no observable affect on habitat or biota.	Between 60-90% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration is present, and stream pattern and stability are not recovering. Withdrawals, if present, may have an observable affect on both flow and habitat or biota.	Between 90-100% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Withdrawals, if present, are large enough to have severe loss of flow and cause little to no habitat or biota.		
	<b>SCORE</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>AV</b>
Notes: Most of SAR Transect 2 has been impacted by dredging, riprap, culverts, and bridge piers.							
<b>REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH</b>							
<b>THE CONDITION INDEX (CI) &gt;&gt;</b>							<b>2.02</b>

INSERT PHOTOS: See Appendix B Photographic Log


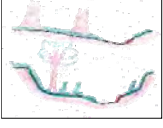



# Stream Assessment Data Form for Level 1

U.S. Army Corps of Engineers Galveston District

File Number	Applicant	Stahler Stream Order	8 Digit HUC	Date	Transect #	Transect Description
SWG-2013-00229	LCRA	2	12090302	3/9/2015	SAR 3	Current Condition

Name(s) of Evaluator(s)	Stream Name and Type
David Long	Jarvis Creek/Ephemeral

**1. Channel Condition:** Assess the cross-section of the stream and prevailing condition (erosion, aggradation).

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>Visual Channel Condition Parameter</b>						
	Channel shows very little incision or widening and little or no evidence of erosion or unprotected banks. Indicators of stability include greater than 80% vegetative cover on the banks, stable point bars and bankfull benches may be present, mid-channel and transverse bars are rare or transient. The stream has access to active floodplain or fully developed bankfull benches. No bulkheading or riprap may be present.	Channel is slightly incised and contains a few areas of active erosion. Indicators of instability include vegetative cover or natural rock protection only present along 60-80% of the Transect, point bars and bankfull benches are likely present and transient sediment is present along 10-40% of the stream bottom. The stream has access to bankfull benches or developed floodplains along portions of the reach. Channel may show evidence of past channel alteration, but should be exhibiting notable recovery of a natural channel. Bulkhead and riprap are limited to 1-25% of the Transect.	Channel is incised or has had its course widened. Indicators of instability include the presence of erosional scars on 40-60% of the Transect, vegetative cover or natural rock only found on 40-60% of the Transect, vertical or undercut banks, or nickpoints associated with headcuts may be present and portions of the channel may be widening while other portions of the channel are narrowing, and transient sediments are found in 40-60% of the natural stream bed or bottom. The stream does not have access to the active floodplain. Bulkheading or riprap is found along 25-50% of the Transect.	Channel is over-widened or incised with vertically or laterally unstable banks. Visual indicators of over-widening and incision include near vertical banks with shallow root depths, erosional scars present along 60-80% of the Transect, vegetative cover or natural rock is limited to 20-40% of the Transect, substantial sediment deposition of uniformed-size material is present along 60-80% of the Transect and point bars and bankfull benches are absent. The stream does not have access to an active floodplain. Bulkheading and riprap are present along 50-80% of the Transect.	Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Indicators of instability include the streambed elevation located below the rooting depth, both banks are vertical or undercut, vegetative surface protection or natural rock is only found along 20% or less of the Transect, the bank is sloughing and erosional scars or raw banks present on 80-100% of the Transect and 80% or more of the natural streambed is covered by substantial sediment resulting in threaded channels. The stream does not have access to an active floodplain.	<b>CV</b>
<b>Score</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>2.5</b>

**Notes:** Stream channel has been historically widened/dredged and approximately 60% of SAR Transect 3 show minimal signs of recovery. Both side of the stream bank appear to be unstable.

**2. RIPARIAN BUFFERS:** Assess both banks' 100-foot riparian areas along the entire Transect.

	Optimal	Suboptimal	Marginal	Poor	Severe		
<b>Riparian Buffers</b>	Native woody species represent greater than 60% of the coverage and wetlands are present.	Native woody community species represent greater than 60% coverage with NO wetlands present within the buffer OR native woody community species represent 30-60% coverage with wetlands present. No maintenance or grazing activities.	Native woody community species represent between 30-60% coverage with NO wetlands present. No maintenance or grazing activities.	Native woody community represents less than 30% coverage with no maintenance or grazing activities.	The buffer is dominated by one or more of the following: lawns, mowed or maintained right-of-way, no-till cropland, actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized or other comparable condition.	The area is dominated by impervious surfaces, mine spoil lands, denuded surfaces, conventional tillage row crops, active feed lots or comparable conditions.	
<b>Condition Scores</b>	<b>5</b>	<b>High = 4.5</b> <b>Low = 4</b>	<b>3</b>	<b>2</b>	<b>1</b>		

**Notes:** The buffer is consistent throughout the transect. Roughly 30% of the riparian buffer is dominated by similar woody species as SAR Transects 1 and 2, with an increased woody vine (*Vitis*) component. Woody species noted include *Quercus* sp., *Acer negundo*, *Morus rubra*, *Carya illinoensis*, *Vitis* sp., and *Platanus occidentalis*. The native woody component of the buffer is much more narrow (~50') than SAR Transect 1 and is adjacent to row-crop cultivation.

<b>Right Bank</b>	% Riparian Area >	<b>60%</b>	<b>10%</b>	<b>30%</b>		<b>100%</b>	
	Score >	<b>4</b>	<b>1</b>	<b>3</b>			
<b>Left Bank</b>	% Riparian Area >	<b>75%</b>	<b>20%</b>	<b>5%</b>		<b>100%</b>	<b>Rt Bank CI &gt; 3.40</b>
	Score >	<b>4</b>	<b>3</b>	<b>2</b>			<b>Lt Bank CI &gt; 3.70</b>

CI= (Sum % RA \* Scores\*0.01)/2

**3. AQUATIC USE:** The Transect is assessed based on the aquatic life use category score assigned to the stream segment by the TCEQ.

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>AQUATIC USE</b>	Aquatic Life Score of Exceptional.	Aquatic Life Score of High. Perennial streams that have not been assessed are also assumed to have an Aquatic Life Score of High.	Aquatic Life Score of Intermediate.	Aquatic Life Score of Limited. Intermittent Streams with Perennial Pools that have not been assessed are also assumed to have an Aquatic Life Score of Limited.	Aquatic Life Score of Minimal. Intermittent and ephemeral streams that have not been assessed are also assumed to have an Aquatic Life Score of Minimal.	<b>UV</b>
<b>Score</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1.00</b>

**Notes:** Jarvis Creek does not have a Texas Commission on Environmental Quality surface water quality health assessment, thus the Aquatic Use score defaults to 1.

## Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Transect #	Transect Description
	LCRA	Lane City, TX	R4	12090302	3/9/2015	SAR3	Current Condition

**4. CHANNEL ALTERATION:** Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>Channel Alteration</b>	Channelization, dredging, alteration or hardening absent. Stream has unaltered pattern or has normalized. No dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures within the Transect.	Less than 30% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration may be present, but stream pattern and stability have recovered. Withdrawals, if present, have no observable affect on flow.	Between 30-60% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration may be present, but stream pattern and stability are beginning to recover. Withdrawals, if present, may have an observable affect on flow, but no observable affect on habitat or biota.	Between 60-90% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration is present, and stream pattern and stability are not recovering. Withdrawals, if present, may have an observable affect on both flow and habitat or biota.	Between 90-100% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Withdrawals, if present, are large enough to have severe loss of flow and cause little to no habitat or biota.	<b>AV</b>
<b>SCORE</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>3.00</b>

**Notes:** Most of this transect has been impacted by historic dredging activities. Dilapidated riprap present within streambed.

**REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH**

	<b>THE CONDITION INDEX (CI) &gt;&gt; 2.51</b>
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**INSERT PHOTOS:** See Appendix B Photographic Log

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**DELTA CONDITION**

**LEVEL 1 STREAM ASSESSMENT DATA FORM**

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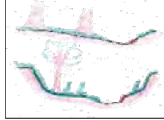



# Stream Assessment Data Form for Level 1

U.S. Army Corps of Engineers Galveston District

File Number	Applicant	Stahler Stream Order	8 Digit HUC	Date	Transect #	Transect Description
SWG-2013-00229	LCRA	2	12090302	3/9/2015	SAR 1	Delta Condition

Name(s) of Evaluator(s)	Stream Name and Type
David Long	Jarvis Creek/Ephemeral

**1. Channel Condition:** Assess the cross-section of the stream and prevailing condition (erosion, aggradation).

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>Visual Channel Condition Parameter</b>						
	Channel shows very little incision or widening and little or no evidence of erosion or unprotected banks. Indicators of stability include greater than 80% vegetative cover on the banks, stable point bars and bankfull benches may be present, mid-channel and transverse bars are rare or transient. The stream has access to active floodplain or fully developed bankfull benches. No bulkheading or riprap may be present.	Channel is slightly incised and contains a few areas of active erosion. Indicators of instability include vegetative cover or natural rock protection only present along 60-80% of the Transect, point bars and bankfull benches are likely present and transient sediment is present along 10-40% of the stream bottom. The stream has access to bankfull benches or developed floodplains along portions of the reach. Channel may show evidence of past channel alteration, but should be exhibiting notable recovery of a natural channel. Bulkhead and riprap are limited to 1-25% of the Transect.	Channel is incised or has had its course widened. Indicators of instability include the presence of erosional scars on 40-60% of the Transect, vegetative cover or natural rock only found on 40-60% of the Transect, vertical or undercut banks, or nickpoints associated with headcuts may be present and portions of the channel may be widening while other portions of the channel are narrowing, and transient sediments are found in 40-60% of the natural stream bed or bottom. The stream does not have access to the active floodplain. Bulkheading or riprap is found along 25-50% of the Transect.	Channel is over-widened or incised with vertically or laterally unstable banks. Visual indicators of over-widening and incision include near vertical banks with shallow root depths, erosional scars present along 60-80% of the Transect, vegetative cover or natural rock is limited to 20-40% of the Transect, substantial sediment deposition of uniformed-size material is present along 60-80% of the Transect and point bars and bankfull benches are absent. The stream does not have access to an active floodplain. Bulkheading and riprap are present along 50-80% of the Transect.	Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Indicators of instability include the streambed elevation located below the rooting depth, both banks are vertical or undercut, vegetative surface protection or natural rock is only found along 20% or less of the Transect, the bank is sloughing and erosional scars or raw banks present on 80-100% of the Transect and 80% or more of the natural streambed is covered by substantial sediment resulting in threaded channels. The stream does not have access to an active floodplain.	<b>CV</b>
<b>Score</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>3.0</b>

**Notes:** There are no expected changes to the condition of the channel of Jarvis Creek upstream of construction activities.

**2. RIPARIAN BUFFERS:** Assess both banks' 100-foot riparian areas along the entire Transect.

	Optimal	Suboptimal	Marginal	Poor	Severe		
<b>Riparian Buffers</b>	Native woody species represent greater than 60% of the coverage and wetlands are present.	Native woody community species represent greater than 60% coverage with NO wetlands present within the buffer OR native woody community species represent 30-60% coverage with wetlands present. No maintenance or grazing activities.	Native woody community species represent between 30-60% coverage with NO wetlands present. No maintenance or grazing activities.	Native woody community represents less than 30% coverage with no maintenance or grazing activities.	The buffer is dominated by one or more of the following: lawns, mowed or maintained right-of-way, no-till cropland, actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized or other comparable condition.	The area is dominated by impervious surfaces, mine spoil lands, denuded surfaces, conventional tillage row crops, active feed lots or comparable conditions.	
<b>Condition Scores</b>	<b>5</b>	<b>High = 4.5</b> <b>Low = 4</b>	<b>3</b>	<b>2</b>	<b>1</b>		

**Notes:** There are no expected changes to the condition of the riparian buffer along Jarvis Creek upstream of construction activities.

<b>Right Bank</b>	% Riparian Area >	<b>50%</b>	<b>40%</b>	<b>10%</b>		<b>100%</b>	
	Score >	<b>4.5</b>	<b>4</b>	<b>3</b>			
<b>Left Bank</b>	% Riparian Area >	<b>90%</b>	<b>10%</b>			<b>100%</b>	<b>Rt Bank CI &gt;</b>
	Score >	<b>4.5</b>	<b>3</b>				<b>4.15</b>
							<b>Lt Bank CI &gt;</b>
							<b>4.35</b>

**3. AQUATIC USE:** The Transect is assessed based on the aquatic life use category score assigned to the stream segment by the TCEQ.

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>AQUATIC USE</b>	Aquatic Life Score of Exceptional.	Aquatic Life Score of High. Perennial streams that have not been assessed are also assumed to have an Aquatic Life Score of High.	Aquatic Life Score of Intermediate.	Aquatic Life Score of Limited. Intermittent Streams with Perennial Pools that have not been assessed are also assumed to have an Aquatic Life Score of Limited.	Aquatic Life Score of Minimal. Intermittent and ephemeral streams that have not been assessed are also assumed to have an Aquatic Life Score of Minimal.	
<b>Score</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>UV</b>
						<b>1.00</b>

**Notes:** Jarvis Creek does not have a Texas Commission on Environmental Quality surface water quality health assessment, thus the Aquatic Use score defaults to 1.

## Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Transect #	Transect Description
	LCRA	Lane City, TX	R4	12090302	3/9/2015	SAR1	Delta Condition

**4. CHANNEL ALTERATION:** Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>Channel Alteration</b>	Channelization, dredging, alteration or hardening absent. Stream has unaltered pattern or has normalized. No dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures within the Transect.	Less than 30% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration may be present, but stream pattern and stability have recovered. Withdrawals, if present, have no observable affect on flow.	Between 30-60% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration may be present, but stream pattern and stability are beginning to recover. Withdrawals, if present, may have an observable affect on flow, but no observable affect on habitat or biota.	Between 60-90% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration is present, and stream pattern and stability are not recovering. Withdrawals, if present, may have an observable affect on both flow and habitat or biota.	Between 90-100% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Withdrawals, if present, are large enough to have severe loss of flow and cause little to no habitat or biota.	<b>AV</b>
<b>SCORE</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>4.00</b>

Notes: There are no expected changes to any current channel alterations upstream of construction activities.

**REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH**

	<b>THE CONDITION INDEX (CI) &gt;&gt; 3.06</b>
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**INSERT PHOTOS:** See Appendix B Photographic Log


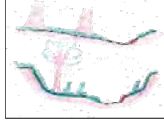



# Stream Assessment Data Form for Level 1

U.S. Army Corps of Engineers Galveston District

File Number	Applicant	Stahler Stream Order	8 Digit HUC	Date	Transect #	Transect Description
SWG-2013-00229	LCRA	2	12090302	3/9/2015	SAR 2	Delta Condition

Name(s) of Evaluator(s)	Stream Name and Type
David Long	Jarvis Creek/Ephemeral

**1. Channel Condition:** Assess the cross-section of the stream and prevailing condition (erosion, aggradation).

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>Visual Channel Condition Parameter</b>						
	Channel shows very little incision or widening and little or no evidence of erosion or unprotected banks. Indicators of stability include greater than 80% vegetative cover on the banks, stable point bars and bankfull benches may be present, mid-channel and transverse bars are rare or transient. The stream has access to active floodplain or fully developed bankfull benches. No bulkheading or riprap may be present.	Channel is slightly incised and contains a few areas of active erosion. Indicators of instability include vegetative cover or natural rock protection only present along 60-80% of the Transect, point bars and bankfull benches are likely present and transient sediment is present along 10-40% of the stream bottom. The stream has access to bankfull benches or developed floodplains along portions of the reach. Channel may show evidence of past channel alteration, but should be exhibiting notable recovery of a natural channel. Bulkhead and riprap are limited to 1-25% of the Transect.	Channel is incised or has had its course widened. Indicators of instability include the presence of erosional scars on 40-60% of the Transect, vegetative cover or natural rock only found on 40-60% of the Transect, vertical or undercut banks, or nickpoints associated with headcuts may be present and portions of the channel may be widening while other portions of the channel are narrowing, and transient sediments are found in 40-60% of the natural stream bed or bottom. The stream does not have access to the active floodplain. Bulkheading or riprap is found along 25-50% of the Transect.	Channel is over-widened or incised with vertically or laterally unstable banks. Visual indicators of over-widening and incision include near vertical banks with shallow root depths, erosional scars present along 60-80% of the Transect, vegetative cover or natural rock is limited to 20-40% of the Transect, substantial sediment deposition of uniformed-size material is present along 60-80% of the Transect and point bars and bankfull benches are absent. The stream does not have access to an active floodplain. Bulkheading and riprap are present along 50-80% of the Transect.	Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Indicators of instability include the streambed elevation located below the rooting depth, both banks are vertical or undercut, vegetative surface protection or natural rock is only found along 20% or less of the Transect, the bank is sloughing and erosional scars or raw banks present on 80-100% of the Transect and 80% or more of the natural streambed is covered by substantial sediment resulting in threaded channels. The stream does not have access to an active floodplain.	
<b>Score</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>3.0</b>

**Notes:** It is expected that the restoration and improvements to the channel and banks within SAR Transect 2 will improve the channel condition of Jarvis Creek.

**2. RIPARIAN BUFFERS:** Assess both banks' 100-foot riparian areas along the entire Transect.

	Optimal	Suboptimal	Marginal	Poor	Severe		
<b>Riparian Buffers</b>	Native woody species represent greater than 60% of the coverage and wetlands are present.	Native woody community species represent greater than 60% coverage with NO wetlands present within the buffer OR native woody community species represent 30-60% coverage with wetlands present. No maintenance or grazing activities.	Native woody community species represent between 30-60% coverage with NO wetlands present. No maintenance or grazing activities.	Native woody community represents less than 30% coverage with no maintenance or grazing activities.	The buffer is dominated by one or more of the following: lawns, mowed or maintained right-of-way, no-till cropland, actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized or other comparable condition.	The area is dominated by impervious surfaces, mine spoil lands, denuded surfaces, conventional tillage row crops, active feed lots or comparable conditions.	
	<b>Condition Scores</b>	<b>5</b>	<b>High = 4.5</b> <b>Low = 4</b>	<b>3</b>	<b>2</b>	<b>1</b>	

**Notes:** No changes to the riparian buffer within SAR Transect 2 is expected.

<b>Right Bank</b>	% Riparian Area >	25%	10%	50%	15%	100%	CI= (Sum % RA * Scores*0.01)/2
	Score >	1.5	1	3	2.5		
<b>Left Bank</b>	% Riparian Area >	25%	10%	40%	25%	100%	<b>Rt Bank CI &gt; 2.35</b>
	Score >	1.5	1	4	3		<b>Lt Bank CI &gt; 2.83</b>

**3. AQUATIC USE:** The Transect is assessed based on the aquatic life use category score assigned to the stream segment by the TCEQ.

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>AQUATIC USE</b>	Aquatic Life Score of Exceptional.	Aquatic Life Score of High. Perennial streams that have not been assessed are also assumed to have an Aquatic Life Score of High.	Aquatic Life Score of Intermediate.	Aquatic Life Score of Limited. Intermittent Streams with Perennial Pools that have not been assessed are also assumed to have an Aquatic Life Score of Limited.	Aquatic Life Score of Minimal. Intermittent and ephemeral streams that have not been assessed are also assumed to have an Aquatic Life Score of Minimal.	
	<b>Score</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>

**Notes:** Jarvis Creek does not have a Texas Commission on Environmental Quality surface water quality health assessment, thus the Aquatic Use score defaults to 1.

## Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Transect #	Transect Description
	LCRA	Lane City, TX	R4	12090302	3/9/2015	SAR2	Delta Condition

**4. CHANNEL ALTERATION:** Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>Channel Alteration</b>	Channelization, dredging, alteration or hardening absent. Stream has unaltered pattern or has normalized. No dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures within the Transect.	Less than 30% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration may be present, but stream pattern and stability have recovered. Withdrawals, if present, have no observable affect on flow.	Between 30-60% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration may be present, but stream pattern and stability are beginning to recover. Withdrawals, if present, may have an observable affect on flow, but no observable affect on habitat or biota.	Between 60-90% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration is present, and stream pattern and stability are not recovering. Withdrawals, if present, may have an observable affect on both flow and habitat or biota.	Between 90-100% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Withdrawals, if present, are large enough to have severe loss of flow and cause little to no habitat or biota.	<b>AV</b>
<b>SCORE</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>3.00</b>

**Notes:** The replacement of the canal flume and construction of a new road which will span Jarvis Creek as well as the removal of a low water crossing with associated culvert will be an improvement from the current channel alterations in place within SAR Transect 2.

**REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH**

	<b>THE CONDITION INDEX (CI) &gt;&gt; 2.40</b>
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**INSERT PHOTOS:** See Appendix B Photographic Log


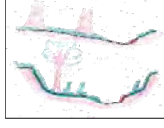



# Stream Assessment Data Form for Level 1

U.S. Army Corps of Engineers Galveston District

File Number	Applicant	Stahler Stream Order	8 Digit HUC	Date	Transect #	Transect Description
SWG-2013-00229	LCRA	2	12090302	3/9/2015	SAR 3	Delta Condition

Name(s) of Evaluator(s)	Stream Name and Type
David Long	Jarvis Creek/Intermittent

**1. Channel Condition:** Assess the cross-section of the stream and prevailing condition (erosion, aggradation).

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>Visual Channel Condition Parameter</b>						
	Channel shows very little incision or widening and little or no evidence of erosion or unprotected banks. Indicators of stability include greater than 80% vegetative cover on the banks, stable point bars and bankfull benches may be present, mid-channel and transverse bars are rare or transient. The stream has access to active floodplain or fully developed bankfull benches. No bulkheading or riprap may be present.	Channel is slightly incised and contains a few areas of active erosion. Indicators of instability include vegetative cover or natural rock protection only present along 60-80% of the Transect, point bars and bankfull benches are likely present and transient sediment is present along 10-40% of the stream bottom. The stream has access to bankfull benches or developed floodplains along portions of the reach. Channel may show evidence of past channel alteration, but should be exhibiting notable recovery of a natural channel. Bulkhead and riprap are limited to 1-25% of the Transect.	Channel is incised or has had its course widened. Indicators of instability include the presence of erosional scars on 40-60% of the Transect, vegetative cover or natural rock only found on 40-60% of the Transect, vertical or undercut banks, or nickpoints associated with headcuts may be present and portions of the channel may be widening while other portions of the channel are narrowing, and transient sediments are found in 40-60% of the natural stream bed or bottom. The stream does not have access to the active floodplain. Bulkheading or riprap is found along 25-50% of the Transect.	Channel is over-widened or incised with vertically or laterally unstable banks. Visual indicators of over-widening and incision include near vertical banks with shallow root depths, erosional scars present along 60-80% of the Transect, vegetative cover or natural rock is limited to 20-40% of the Transect, substantial sediment deposition of uniformed-size material is present along 60-80% of the Transect and point bars and bankfull benches are absent. The stream does not have access to an active floodplain. Bulkheading and riprap are present along 50-80% of the Transect.	Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Indicators of instability include the streambed elevation located below the rooting depth, both banks are vertical or undercut, vegetative surface protection or natural rock is only found along 20% or less of the Transect, the bank is sloughing and erosional scars or raw banks present on 80-100% of the Transect and 80% or more of the natural streambed is covered by substantial sediment resulting in threaded channels. The stream does not have access to an active floodplain.	
<b>Score</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>2.5</b>

**Notes:** It is expected that the streamflow will be more consistent after the nature flow of the channel has been restored upstream of SAR Transect 3. The highly erosional plunge pool and unpredictable nature of the stream channel and banks will be restored which is expected to improve the channel condition downstream.

**2. RIPARIAN BUFFERS:** Assess both banks' 100-foot riparian areas along the entire Transect.

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>Riparian Buffers</b>	Native woody species represent greater than 60% of the coverage and wetlands are present.	Native woody community species represent greater than 60% coverage with NO wetlands present within the buffer OR native woody community species represent 30-60% coverage with wetlands present. No maintenance or grazing activities.	Native woody community species represent between 30-60% coverage with NO wetlands present. No maintenance or grazing activities.	Native woody community represents less than 30% coverage with no maintenance or grazing activities.	The buffer is dominated by one or more of the following: lawns, mowed or maintained right-of-way, no-till cropland, actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized or other comparable condition.	The area is dominated by impervious surfaces, mine spoil lands, denuded surfaces, conventional tillage row crops, active feed lots or comparable conditions.
	<b>Condition Scores</b>	<b>5</b>	<b>High = 4.5</b> <b>Low = 4</b>	<b>3</b>	<b>2</b>	<b>1</b>

**Notes:** There are no expected changes to the condition of the riparian buffer along Jarvis Creek downstream of construction activities.

<b>Right Bank</b>	% Riparian Area >	<b>60%</b>	<b>10%</b>	<b>30%</b>		<b>100%</b>	
	Score >	<b>4</b>	<b>1</b>	<b>3</b>			
<b>Left Bank</b>	% Riparian Area >	<b>75%</b>	<b>20%</b>	<b>5%</b>		<b>100%</b>	<b>Rt Bank CI &gt; 3.40</b>
	Score >	<b>4</b>	<b>3</b>	<b>2</b>			<b>Lt Bank CI &gt; 3.70</b>

CI = (Sum % RA \* Scores^0.01)/2

**3. AQUATIC USE:** The Transect is assessed based on the aquatic life use category score assigned to the stream segment by the TCEQ.

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>AQUATIC USE</b>	Aquatic Life Score of Exceptional.	Aquatic Life Score of High. Perennial streams that have not been assessed are also assumed to have an Aquatic Life Score of High.	Aquatic Life Score of Intermediate.	Aquatic Life Score of Limited. Intermittent Streams with Perennial Pools that have not been assessed are also assumed to have an Aquatic Life Score of Limited.	Aquatic Life Score of Minimal. Intermittent and ephemeral streams that have not been assessed are also assumed to have an Aquatic Life Score of Minimal.	
	<b>Score</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>

**UV**  
**1.00**

**Notes:** Jarvis Creek does not have a Texas Commission on Environmental Quality surface water quality health assessment, thus the Aquatic Use score defaults to 1.



## Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Transect #	Transect Description
	LCRA	Lane City, TX	R4	12090302	3/9/2015	SAR3	Delta Condition

**4. CHANNEL ALTERATION:** Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

	Optimal	Suboptimal	Marginal	Poor	Severe	
<b>Channel Alteration</b>	Channelization, dredging, alteration or hardening absent. Stream has unaltered pattern or has normalized. No dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures within the Transect.	Less than 30% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration may be present, but stream pattern and stability have recovered. Withdrawals, if present, have no observable affect on flow.	Between 30-60% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration may be present, but stream pattern and stability are beginning to recover. Withdrawals, if present, may have an observable affect on flow, but no observable affect on habitat or biota.	Between 60-90% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Evidence of past alteration is present, and stream pattern and stability are not recovering. Withdrawals, if present, may have an observable affect on both flow and habitat or biota.	Between 90-100% of the Transect is impacted by dredging, dams, dikes, levees, culverts, riprap, bulkheads, armor, drop structures or withdrawal structures. Withdrawals, if present, are large enough to have severe loss of flow and cause little to no habitat or biota.	<b>AV</b>
<b>SCORE</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>3.00</b>

Notes: There are no expected changes to the channel alteration downstream of construction activities.

**REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH**

	<b>THE CONDITION INDEX (CI) &gt;&gt;</b>	<b>2.51</b>
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**INSERT PHOTOS:** ee Appendix B Photographic Log

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**APPENDIX B**

**Photographic Log**

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Photo 1. Photograph of SAR Transect 1 taken during the stream assessment, facing upstream.



Photo 2. Photograph on the north side of SAR Transect 2 taken during the stream assessment, facing south towards the existing concrete flume and timber bridge.





Photo 3. Photograph of the condition of Jarvis Creek during normal climatic conditions. Photograph taken within SAR Transect 2, facing south towards the existing concrete flume and timber bridge.



Photo 4. Photograph of SAR Transect 2 taken during the stream assessment, facing upstream on the north side of the low water crossing and culvert.



Photo 5. Photograph of the plunge pool within SAR Transect 2 taken during the stream assessment, facing downstream over the culvert.



Photo 6. Photograph of the plunge pool downstream of the culvert within SAR Transect 2, taken during normal climatic conditions.





Photo 7. Photograph of SAR Transect 3 taken during the stream assessment, facing upstream.



Photo 8. Photograph of SAR Transect 3 during normal climatic conditions, facing downstream.

**Attachment 5**  
**Project Implications for Channel Morphology**

## A. April 24, 2014 Assessment

# Lower Basin Reservoir Project – Characterization of Off-Channel Reservoir Return Flows into the Colorado River and Implications for Channel Morphology

PREPARED FOR: Lower Colorado River Authority  
PREPARED BY: CH2M HILL  
COPY TO: File  
DATE: April 24, 2014  
PROJECT NUMBER: 491361

## Purpose

This technical memorandum (TM) characterizes the geomorphic effects of return flows from the proposed off-channel Lower Basin Reservoir (LBR) that will be constructed and operated as the key component of the Lower Basin Reservoir Project (project). Specifically, this TM describes the larger geomorphic context of the project location, proposed return flow regime, and qualitative comparison of pre- and post-project conditions to estimate the change in sediment transport as a result of proposed return flows.

## Overview of Study Area

The reach of interest extends from the existing horizontal pump station associated with the Lane City canal diversion (also known as Gulf Coast Irrigation Division Pumping Plant No. 2) to approximately the Wharton / Matagorda County line. Sediment transport assessment does not explicitly extend to the mouth of the lower Colorado River, but results of the analysis are used to implicitly assess downstream sediment transport impacts. Diversions from the river into the LBR are planned to occur at the existing river intakes at Pumping Plant No. 2 located approximately 850 and 950 feet upstream of the existing Lane City Dam (LCD) structure, a low head dam on the Colorado River. The river return outfall from the LBR to the river will be located downstream of the existing intakes, approximately 750 feet upstream of the LCD. Figure 1 provides the layout of the proposed facilities in relation to the lower Colorado River and LCD.

## Geomorphic Context

The geomorphic context of the project area is summarized in the following sections.

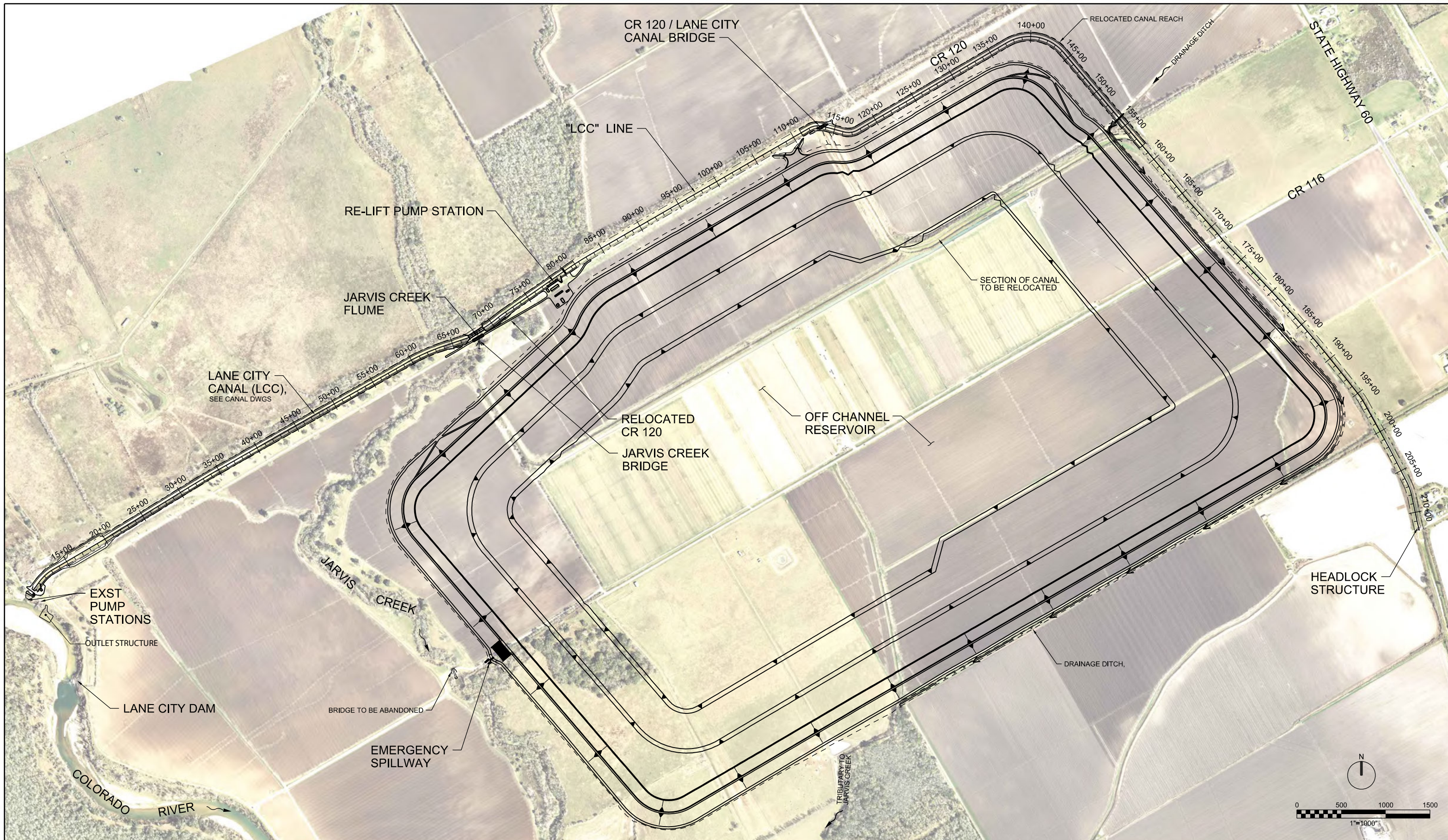
### History of Facilities on the River

The Lane City canal has been in use since the early 1900s to deliver Colorado River water to irrigate fields on the east side of the river. The existing Gulf Coast Irrigation Division Pumping Plant No. 2 includes five pumps to pull water from the river to feed the canal. The three existing horizontal pumps and intakes were constructed around 1948. The two vertical turbine pumps were installed in 1967 and 1976, respectively. The total combined permitted capacity of Pumping Plant No. 2 is 561 cubic feet per second (cfs).

Lane City Dam was constructed in 1984 approximately 850 feet downstream of the vertical turbine pumps. The LCD consists of a two-stage concrete weir mounted on a steel sheet pile cutoff wall with a concrete stilling basin structure adjacent to the lower portion of the weir. The LCD's abutments are steel sheet pile structures embedded in the river bank. A 25-foot-long by 8-foot-high bascule gate is incorporated into the lower weir to allow release of the pool created when the gate is in its raised position.

Upstream of Austin, the Highland Lakes can store over 2 million acre-feet of water. Mansfield Dam, that forms Lake Travis, was completed in 1941 and is the only flood storage in the basin.





OVERALL SITE AND ACCESS PLAN

FIGURE 1



## Historical River Conditions

The project is situated in a reach of the lower Colorado River considered to represent a relatively recent incision into the Beaumont Clay, a deltaic nonmarine deposit containing thick interbedded layers of clay, fine sand, and silt (Terracon, 2012). Blum and Aslan (2006) concluded that the river abandoned its late Pleistocene and Holocene incised valley (“avulsed”) about 200 to 300 years ago just downstream of Wharton, Texas, and reoccupied a paleochannel that was active during the last glacial cycle. The departure from the older river channel is visible on the Seguin Sheet of the 1:250,000 Geologic Map of Texas, provided as Figure 2. The lower Colorado River in the vicinity of the project reach, LCD, and river intakes are located within the reoccupied paleochannel.

Blum and Aslan (2006) evaluated the historic causes of channel avulsion in the Texas Gulf coastal plain. They concluded that the historic avulsion in the lower Colorado River was driven by a high supply of sediment from upstream along with rising sea levels. The space available for deposition in the coastal plain is filled with sediments from upstream and has led to repeated episodes of large-scale channel shifting and thick successions of massive flood-basin muds encasing crevasse splay sands. This history and configuration of fluvial deposits along the river has created riverbanks that are relatively high – and composed of fine substrate prone to bank collapse via slumping, due to repeated wetting and drying cycles.

### Aerial Image Interpretation (1930 to 2010)

A series of aerial images provided as Attachment A were reviewed for changes in channel planform (alignment) over time, with the oldest aerial image dating to September 30, 1930. The images were not digitally rectified, but the photos were aligned using common observable features to allow some large-scale observations of channel geomorphic change. Also, interpretation of channel position on the order of 100 feet or less is difficult given the scale of the images, different flow magnitude, and changes in foliage, as well as sun orientation and shadows.

Despite these challenges, patterns appear. For example, as shown in Figure 3, which compares 1930 and 2010 aerial imagery, the channel trended toward a down-valley meander shift, both translational and rotational, in the large bend located approximately 1 mile downstream of the LCD. Also evident in Figure 3 is the extension of the first meander bend downstream of the LCD. The extension is less pronounced than the shift observed in the larger downstream bend, but it is evident. The underlying cause of meander migration in these photographs is likely the same as what causes avulsions at the geologic timescale—the high supply of sediment of the Colorado River and its geologic setting in a lowland coastal plain. The resulting lack of accommodation space leads to sediment deposition and the subsequent rapid growth of point bars diverts flow against the opposite bank. The process of bar growth and flow deflection drove the historical rapid evolution of channel meanders.

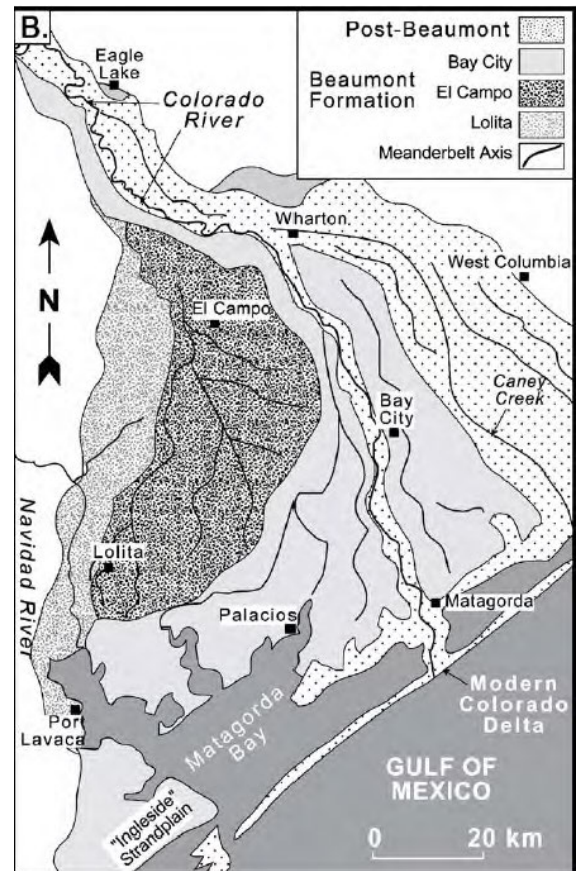


FIGURE 2  
View of Channel Deposits and Avulsion Pathways in the Lower Colorado River Valley

Source: Blum and Aslan, 2006



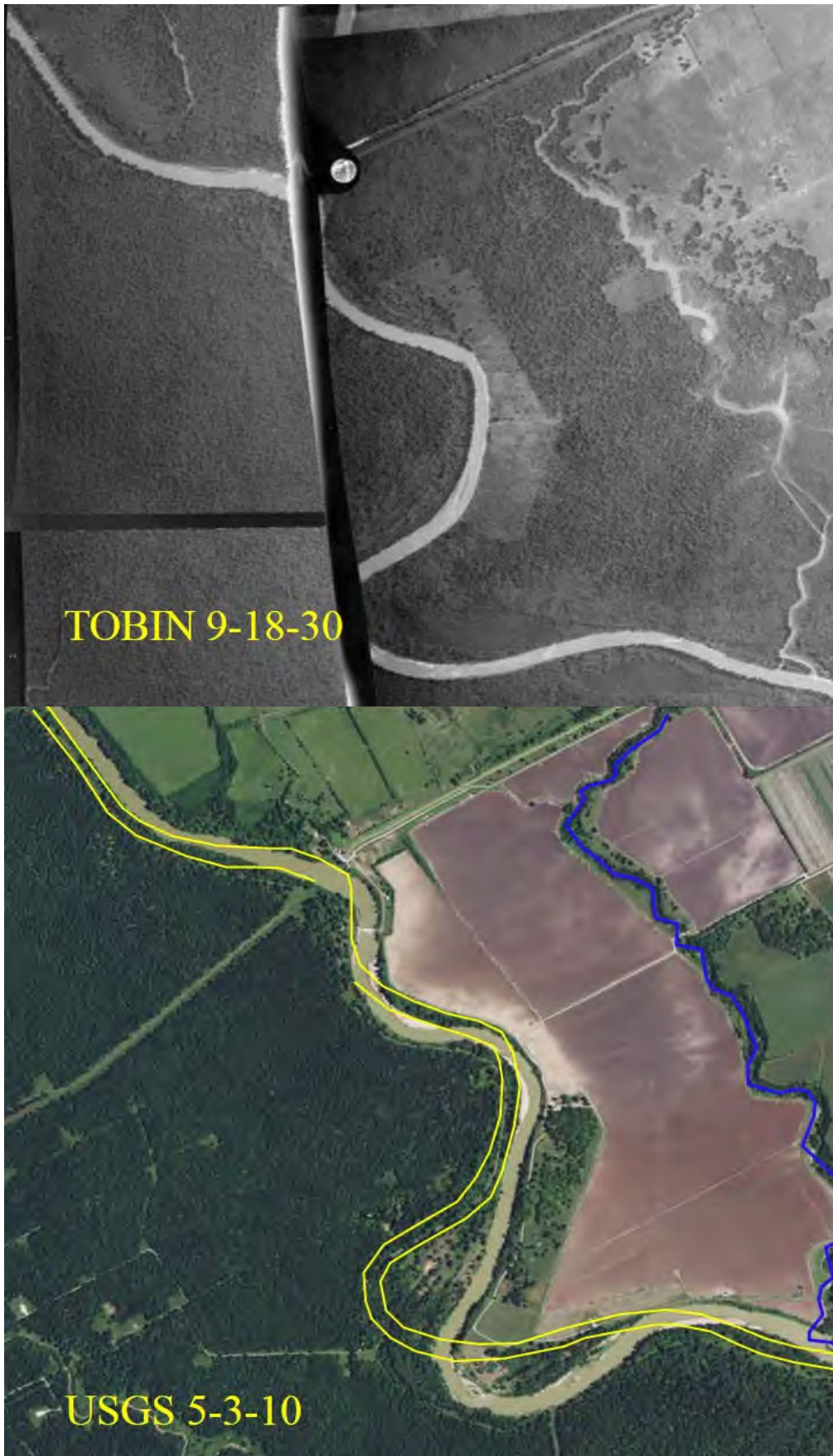


Figure 3. Historical aerial image of the Colorado River in 1930, before upstream flow control, and the same river reach in 2010.

The second oldest available image is from 1956 (Figure 4). Comparison of the 1956 to 2010 photos suggests that little meander growth and channel shift has occurred between the two periods; therefore, most of the meander growth and shift observed in Figure 3 coincides with the period before the Highland Lakes' large dams were constructed upstream during the 1940s and 1950s. After construction of the upstream dams, which curtailed the frequency and magnitude of downstream flooding, changes in channel pattern through the reach appear to be much smaller and slower. This is not surprising given the reduction in peak flows attributable to upstream dams. Some change in the overall sediment regime is also expected, but the effect of sediment regime change is often more complex. For instance, upstream capture of sediment may induce clear water scour in the system downstream, but the reduction in peak flows may result in dampening the overall transport capacity, especially with increasing distance from the Highland Lakes. Most likely, the construction of the dams reduced the sediment supply, partially eliminating the main driver for meander migration (i.e., a high supply of sediment, which induced sediment deposition, point bar growth, and flow deflection that caused meander migration).

Locally, the meander at the Lane City canal pump intakes began to migrate downstream in the mid-1990s, when the channel thalweg (dominant flow path) shifted southwest toward the center of the channel and caused the accretion of a sandbar on the outer channel bend that left the pump intakes buried. This can be seen in Attachment A, Figure A-10. The Lower Colorado River Authority (LCRA) responded by initially cutting a backchannel through the sand to reconnect the pump intakes to the channel, and subsequently by installing palisades on the west bank upstream of the pump intake to accumulate sediment and debris, and force the channel thalweg to the east bank at the pump intakes. These palisades were successful and have led to the formation of large debris islands that maintain the current, hardened channel form near the pump intakes.

Overall, the river system continues to adjust to changes in flow and sediment conditions, but the rate of meander migration and translation appear to have decreased markedly since upstream dams were built and local channel hardening has occurred.

## Current Conditions

In the vicinity of the project, the Colorado River is currently a meandering alluvial, sand-dominated channel with point bars primarily on the inner banks of meanders. The substrate is dominated by sand, but small gravel is present on the surface of the bar along the west bank of the river just downstream of the pool below the LCD. Where the banks have not been overly steepened or artificially armored near the LCD, they are generally well vegetated with a variety of grass, vine, shrub, and tree species.

The local river reach spanning approximately 5 river miles upstream and 5 river miles downstream of the project has a sinuosity of 1.3 (*sinuosity* is defined as the ratio of channel length to the straight-line valley length). Although the LCD is located just past the apex of a meander bend, the channel sinuosity of the upstream 5-mile reach is quite straight with a sinuosity of only 1.1. Downstream of the LCD, the channel pattern is more sinuous, approximately 1.4 over the downstream 5-river miles. As a result, the approaching or upstream river slope would be expected to be steeper and, therefore, subject to greater velocity and scour potential than the more sinuous downstream reach. This inference is confirmed by recent hydraulic modeling completed by CH2M HILL that yielded increased flow velocities upstream of the LCD in comparison to flow velocities in the downstream reach (CH2M HILL, 2013b). This condition may suggest that the downstream reach, and the area immediately upstream of the LCD when the bascule gate is up, is depositional as energy decreases from the upstream reach.



Figure 4. Historical aerial image of the Colorado River in 1956, and the same river reach in 2010.

Locally, the presence of the LCD impacts sediment transport when the bascule gate is raised. Raising the bascule gate increases upstream flow depths, decreases upstream shear stress, and leads to deposition of sediments in the pumping pool upstream of the LCD. However, the ability to lower the bascule gate to the elevation of the stilling basin provides periodic flushing of sediment accumulated in the pumping pool upstream of the LCD. In the absence of such flushing, the upstream channel would likely cause sediment deposition at the pump intakes, lost pumping pool capacity and bank instability in the river approach channel to the dam. Operation of the LCD may cause upstream bank failure due to slumping caused by saturation and subsequent drawdown of the pumping pool (i.e., fluctuating water levels) regulated by the LCD. This project will not necessitate changes in the operation of the LCD; therefore, no change is expected in geomorphic processes from what has been occurring the past several decades since the construction of the LCD.

Immediately downstream of the LCD, the channel bed has scoured, likely due to hydraulic waves and rollers/vortices rolling off the stilling apron, concentration of flow when the gate is open, constriction of the channel by hardened structures and riprap upstream and downstream, and non-uniform hydraulic conditions at the downstream channel, slopes, and banks. The resulting flow concentration and induced turbulence tends to destabilize or scour the sandy riverbed and bank toes both upstream and downstream of the LCD. Palisades have been installed near the LCD over the last two decades, both upstream and downstream, to reduce near-bank velocity and shear stress.

As part of the overall project, measures will be constructed to dissipate energy and protect the riverbed and banks from erosion at the river outfall. Local scour potential due to return flows is expected to be managed, and the future (post-project) supply of sediment from these localized areas is not expected to change compared to current (pre-project) conditions.

## **BIO-WEST (2005, 2006) Sediment Transport Studies**

Although previous studies conducted by BIO-WEST were focused upstream of the project area, BIO-WEST, Inc. (BIO-WEST) described long-term sediment transport characteristics of the lower Colorado River in two reports (Bio-West; 2005, 2006). The reports contain the most current, detailed sediment transport studies for the lower Colorado River and are briefly summarized here for general reference. For the geomorphic and sediment transport studies, the lower Colorado River was divided into four geomorphically similar reaches below Longhorn Dam in Austin (BIO-WEST, 2005):

- The first (most upstream) reach is a dominantly coarse-bedded and dam-influenced reach immediately below Longhorn Dam.
- The second reach is a gravel and bedrock reach from upstream of Bastrop to downstream of Columbus.
- The third reach is defined as a transitional reach from downstream of Columbus to near Garwood.
- The fourth reach is defined as an alluvial/coastal plain reach below Garwood generally characterized by tighter and more regular meanders and finer-grained (sand-dominated) bed and bank material. The project and the reach downstream are fully contained within the fourth reach as defined by BIO-WEST (2005).

Figure 5 provides an overview map of the BIO-WEST intensive study areas, which were primarily focused on assessing aquatic habitat for Blue Sucker. As part of its assessment, BIO-WEST conducted sediment transport analyses at two of the intensive study sites, La Grange and Columbus (BIO-WEST, 2005). The La Grange site is located within Reach 2, as defined by BIO-WEST, and approximately 70 miles northwest and upstream of the project. The Columbus site is located at the boundary between Reaches 2 and 3 approximately 50 miles northwest and upstream of the project (BIO-WEST, 2005).



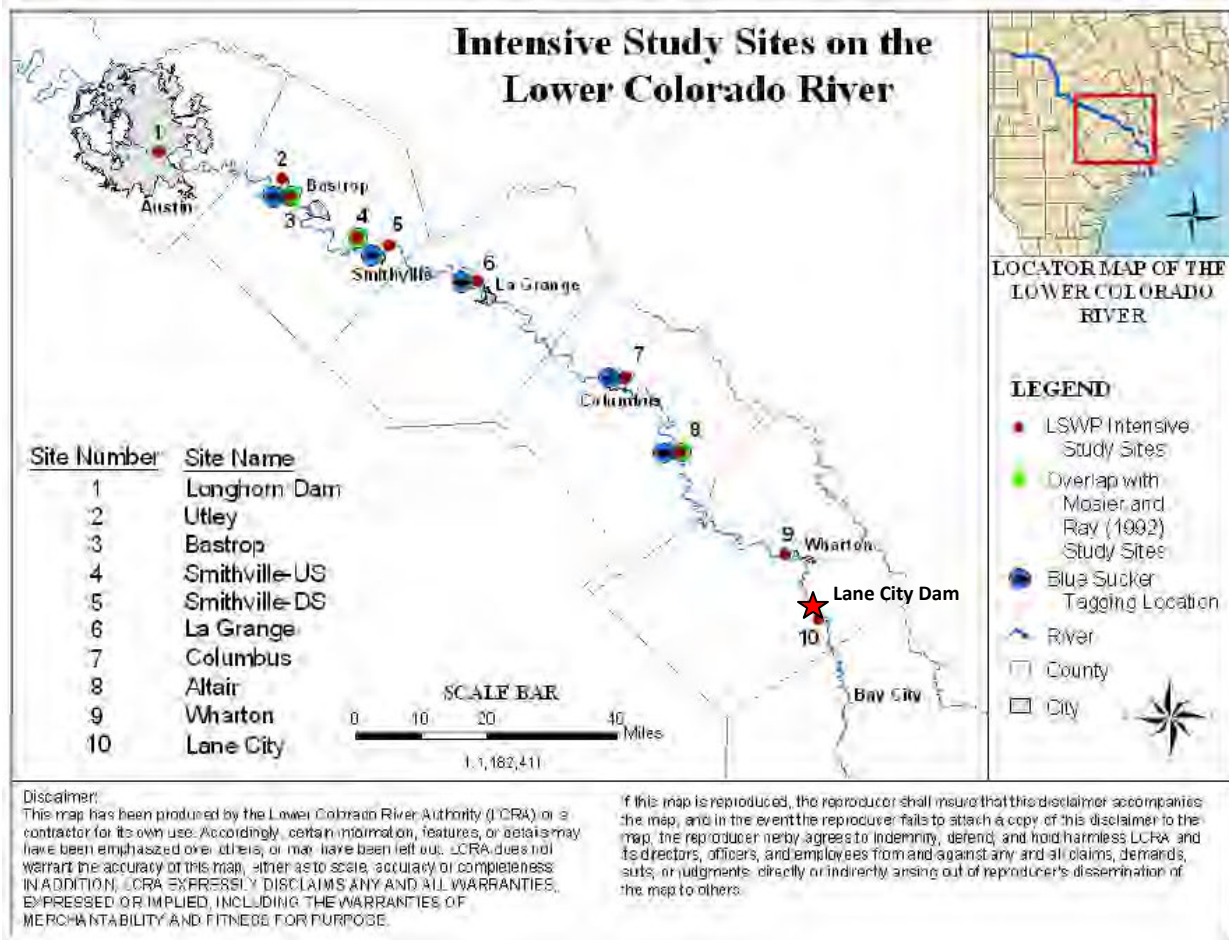


FIGURE 5  
**Intensive Study Sites on the Lower Colorado River**  
 Source: BIO-WEST, 2005

Since the proposed project is downstream and in a different geomorphic setting than the BIO-WEST study sites, parameters such as grain size distribution, hydraulic variables, and sediment transport capacity at the project would differ from those at the La Grange and Columbus sites. However, the findings made by BIO-WEST (2005, 2006) at the La Grange and Columbus sites can be used to qualitatively compare trends and guide analyses. For instance, dominant discharges for sand-sized sediments in these reaches are useful to estimate the dominant discharge at the project. Analyses of sediment transport conditions at, and downstream of, the project are discussed in the “Sediment Transport Evaluation” section below.

### Channel-Forming Flows

Although capacity for sediment transport generally increases with discharge, more frequently recurring events can potentially transport more sediment over time than infrequent, large floods. Therefore, the flow that transports the greatest amount of sediment over time is considered the flow of most geomorphic significance (e.g., Wolman and Miller, 1960; Nash, 1994) and the “channel-forming” effective discharge. As reference, the 1- or 2-year recurrence interval flood is frequently considered to coincide with the effective discharge (BIO-WEST, 2006). Table 1 summarizes the effective discharge estimates from BIO-WEST (2006) in rows 1 to 4, and the recurrence interval discharge estimates and daily average exceedance flows at the project location in rows 5 to 9. The flow rates in rows 8 and 9, with 50 and 90 percent exceedance, are comparable to the sand-sized sediment effective discharges estimated by BIO-WEST (compare rows 1 and 3 to rows 8 and 9). The gravel-sized sediment effective discharges are larger, with an approximate recurrence interval of 2 years or more (compare row 2 to row 5, and row 4 to row 6).

TABLE 1  
**Effective Discharge and Recurrence Interval Flows**  
*Lower Basin Reservoir Project*

Location	Discharge Type	Discharge (cfs)	Reference
<b>Computed Effective Discharges (Dominant Discharge)</b>			
1. La Grange	Effective (sand-sized sediments and smaller)	1,700	BIO-WEST
2. La Grange	Effective (gravel-sized sediments)	28,000	BIO-WEST
3. Columbus	Effective (sand-sized sediments and smaller)	2,000	BIO-WEST
4. Columbus	Effective (gravel-sized sediments)	31,500	BIO-WEST
<b>Estimated Recurrence Interval Discharges</b>			
5. La Grange	2-Year Recurrence Interval Flood	20,600	
6. Columbus	2-Year Recurrence Interval Flood	31,300	
7. Project	90 Percent Exceedance Flow <sup>a</sup>	450	CH2M HILL, 2013a
8. Project	50 Percent Exceedance Flow <sup>a</sup>	1,260	CH2M HILL, 2013a
9. Project	10 Percent Exceedance Flow <sup>a</sup>	5,360	CH2M HILL, 2013a

<sup>a</sup> Percent exceedance flow values are not annual recurrence interval flows (flood flows). They are exceedance flows based on the daily average discharges observed at the United States Geological Survey (USGS) Wharton gauge.

The effective discharges provided in Table 1 that are most relevant to the reach surrounding the project are those that pertain to the transport of sand-sized sediments. The sediment transporting “effective discharges” for sand at the upstream La Grange/Columbus sites are in the range of 1,700 cfs to 2,000 cfs, with respective percent exceedances of approximately 58 and 63 percent. However, differences in channel morphology, size, contributing drainage area, and slope between the La Grange/Columbus sites and the project reach preclude the direct application of the La Grange/Columbus effective discharges to the project reach. At a conceptual level, reduced sediment transport capacity in the project reach, suggested by the sand-dominated substrate in contrast to gravelly substrate upstream, suggests that less energy is available to transport sediment in the project reach. However, a resultant decrease in substrate sediment size will increase the amount of sediment transported at an equivalent energy [discharge]. Therefore, differences in channel morphology between the BIO-WEST study and project reach are reasonably expected to result in an effective discharge for the project reach that is comparable to, but less than or greater than, that estimated in the La Grange/Columbus Reach.

The exact difference in “effective discharge” between the project reach and the upstream La Grange/Columbus sites is not known, but the differences are expected to be much less than an order of magnitude. To account for this uncertainty, the effective discharge was assumed to occur in the range between the 50 percent exceedance discharge of 1,260 cfs (comparable to the La Grange/Columbus sites) and the 90 percent exceedance discharge of 5,360 cfs (providing for the anticipated decreased sediment transport capacity). Importantly, this range of percent exceedance indicates that estimated channel-forming flows downstream of the LCD are fairly frequent, being exceeded between about half and 10 percent of the time, and much more frequently than once per year (as would be the case for an effective discharge equivalent to the 1- or 2- year recurrence interval discharge). Furthermore, this suggests that the lower end



of the effective discharge range potentially would be affected by diversions and releases from the proposed LBR project.

### River Flow Rates With and Without Project

Colorado River hydrology, both with and without the proposed project, was evaluated by LCRA and its consultant (Hydros). LCRA evaluated with- and without-project hydrology using Riverware, a hydrologic model that accounts for river flow, diversions, in- and off-channel storage, and storage releases to the river. Using a 72-year period of historical flow measurements to assess long-term hydrology, LCRA evaluated the with- and without-project hydrology of the river at the LBR intake/outfall based on discussions between LCRA and CH2M HILL on the operation criteria for the proposed project.

### Description of Planned Return Flow Operation

The proposed project would alter the hydrology of the Colorado River downstream of the proposed diversion facilities as flow available to LCRA under the terms of its existing water right is diverted from the river, temporarily stored in the LBR, and released back to the river when downstream water demand exceeds the river flow available for diversion downstream. Figure 6 provides a conceptual illustration of routed water via the Colorado River, canals, and pipes. Diversion flow to the LBR is labeled Q5, and releases back to the Colorado River from the LBR are labeled Q8. Q1 represents flow in the Colorado River upstream of the proposed project; Q2 represents flow in the 100 feet of the Colorado River between the existing Lane City canal diversion and LBR release facilities. Q3 combines Q8 and Q2 and therefore represents downstream flow conditions. Q3, with and without project, was used to assess incremental downstream geomorphic impacts.

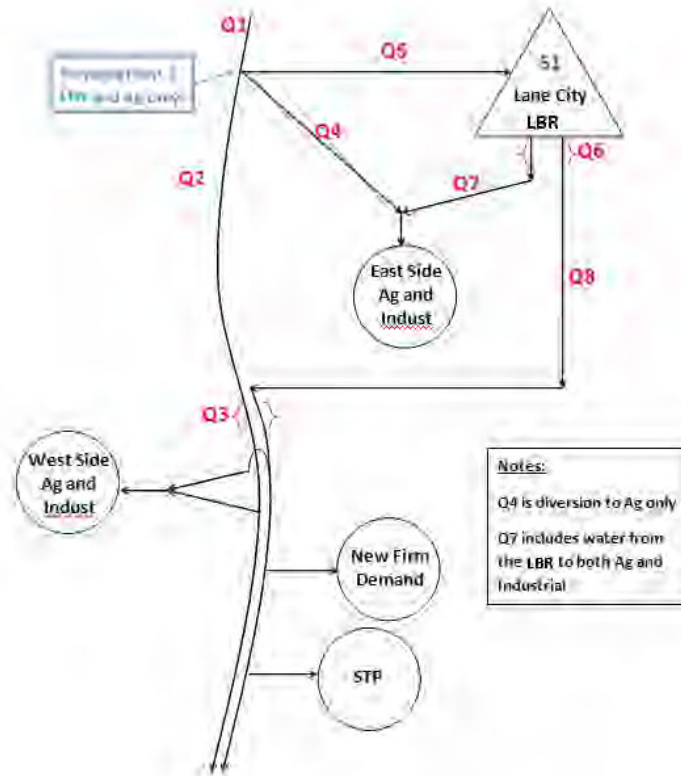


FIGURE 6 Model Schematic for Flows to and from the Lower Colorado River

Figure 7 summarizes the monthly LBR return flows to the river. In general, large but less frequent, flow releases are made during the summer months when irrigation demand is high and river flows are typically low; small, but frequent, releases are also made during the winter months. The “box” for each month contains 50 percent of the monthly values, and the “whiskers” show the extent of the farthest data point. The red diamond is the mean of the data for the month, and the horizontal line within the box is the median of the data for the month. The percentages shown across the top of the graph are the percent of days during each month when there is a return flow to the river.

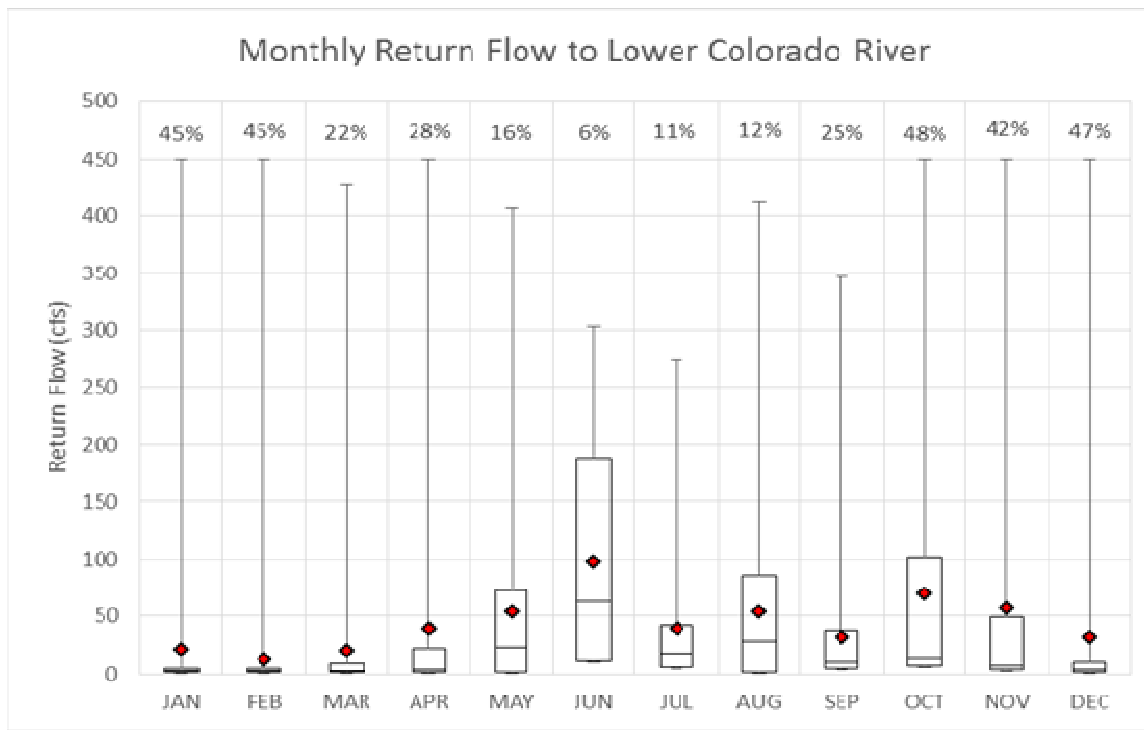


FIGURE 7  
**Average Monthly Return Flow (Q8) to Lower Colorado River (with project)**

Figure 8 is a flow-duration curve with and without the proposed project for the modeled reach downstream of the proposed project. Since the LBR can meet a portion of the demands at this location, less water will be released from LCRA’s primary upstream water supply reservoirs, lakes Buchanan and Travis, if the project is constructed. With less releases from lakes Buchanan and Travis arriving at this location, along with river diversions to meet demands and fill the LBR, with-project flows will generally be lower downstream of the proposed project. However, there will still be periods when downstream demands exceed river flow available for downstream diversion, and water from the LBR will be returned to the river, increasing the river flow rate.

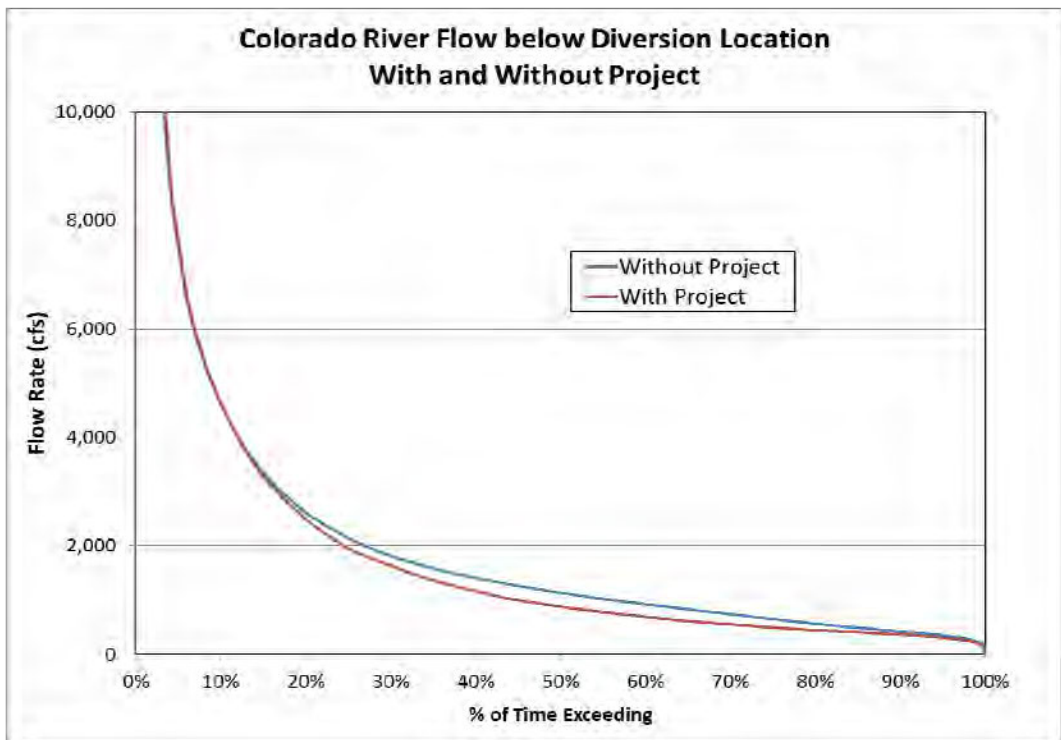


FIGURE 8  
**Q3 Flow Duration Curve, with and without Project**

Flows greater than 3,000 cfs, which are exceeded less than approximately 15 percent of the time, are very similar when comparing the with- and without-project scenarios. Low flows of less than approximately 500 cfs are similar for both with- and without-project scenarios. The difference occurs when the Colorado River flows below the diversion range between approximately 500 and 3,000 cfs. The flows without the project exceed those with the project by 200 cfs or less. As previously indicated, the *reduction* in downstream flow rates with LBR releases is due to differences in overall river operations with and without the project.

**Percent Change in Flow Regime and Relative Magnitude of Operational Flows versus “Channel-forming Flows”**

For the with-project scenario, Figure 9 provides a box plot of individual flow releases over the 72-year simulation. The “box” for each flow range contains 50 percent of the simulated values, and the “whiskers” show the extent of the farthest data point. The red diamond is the mean of the data for the flow range, and the horizontal line within the box is the median of the data for the flow range.<sup>1</sup> Figure 9 indicates that flow releases compose up to 70 percent, but typically less than 20 percent, of the total downstream flow when total flows are less than 1,000 cfs. At lower percent exceedance flow rates (higher natural river flows), the LBR discharges represent a steadily smaller fraction of the total river flow. In the effective discharge range for sand-sized sediments (roughly 2,000 to 5,000 cfs; see above), LBR releases represent less than 20 percent of the total flow, with most discharges representing less than 2 percent (tight box along the bottom of Figure 9). Therefore, during flow releases that have the greatest long-term potential to transport large quantities of sediment, the flow contribution from the LBR becomes small, diminishing as total flow rates increase. Within the with-project scenario, LBR releases are expected to increase downstream sediment transport capacity, but only marginally; compared to the without-project scenario.

<sup>1</sup> A value of 50 percent would correspond to flow releases being equal in magnitude to *upstream* Colorado River flow such that when combined, both contributions account for half of the total flow.

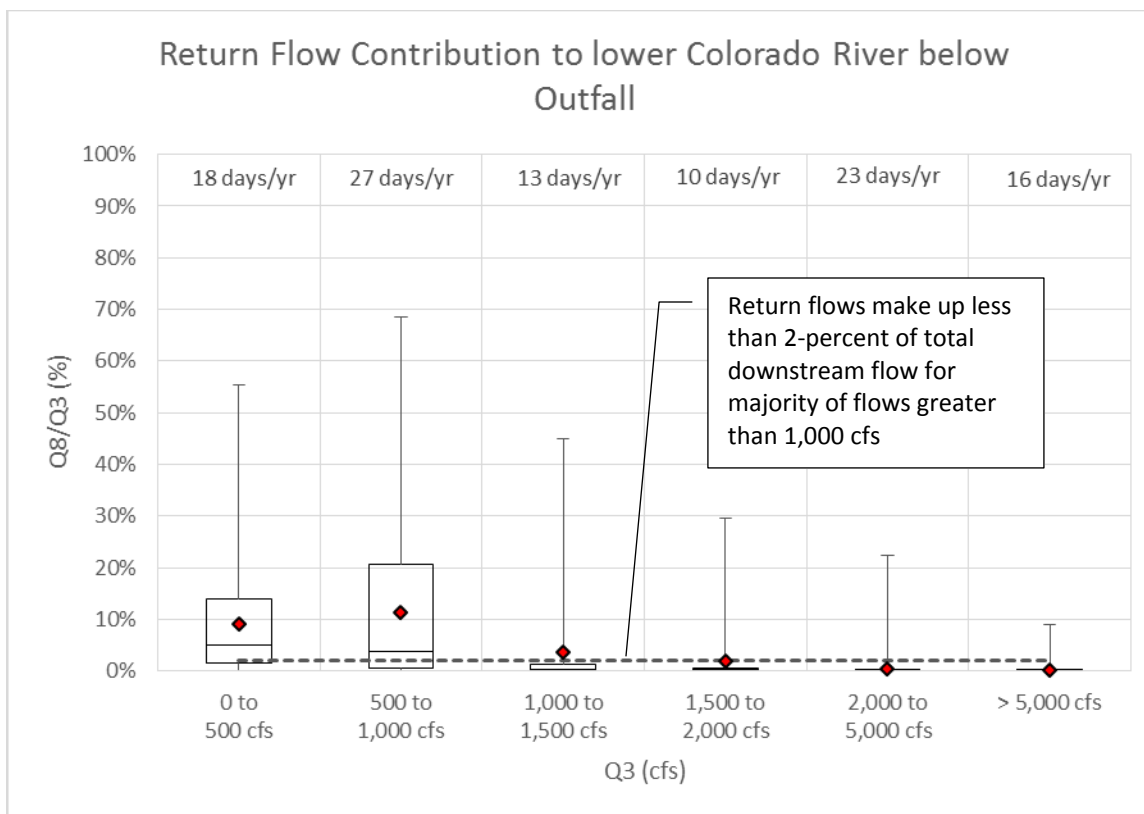


FIGURE 9  
Return Flow Contribution to Lower Colorado Flow below Outfall (with project)

### Sediment Transport Evaluation

#### Approach

As illustrated in Figure 9, LBR releases comprise a large portion of relatively small flows; however, for flows closer in magnitude to the estimated effective discharge (roughly 2,000 cfs to 5,000 cfs), flow releases comprise just over 20 percent of the total flow, and typically less than 2 percent. While comparison of flow magnitudes is one approach to evaluate contribution to potential sediment movement, another evaluation of the potential changes in sediment transport capacity incorporates the entire period of record and full project operation (i.e., accounting for flow diversions also), as described in this section.

Simplified sediment transport analyses were conducted to evaluate the magnitude of the potential change in transport of sand-sized sediments due to the operation of the proposed LBR. Two methods were used to estimate sediment transport. The first method used was the Ackers and White (1973, as presented in Yang, 1996) total load transport equation, and the second method was application of a sand transport rating curve based on United States Geological Survey (USGS) measurements. Selection of the Ackers and White equation is consistent with the BIO-WEST studies and is appropriate for rivers where the bed substrate is predominantly sand. Grain size distributions measured in three sediment grab samples obtained upstream of the LCD on June 5 and 6, 2013, were used to estimate dominant grain size for use in the Ackers and White calculation. The average D50 for the three samples is approximately 0.44 millimeters (mm) (i.e., medium sand).

Hydraulic parameters such as flow depth, channel slope, and velocity were obtained from current HEC-RAS models for the lower Colorado River (CH2M HILL, 2013b). Model cross section 245242.5 (less than 8 miles downstream of the LBR river outfall) was used to represent the below diversion (Q3) location. Even though the outfall location is planned to be upstream of the LCD, a cross section below the dam was deemed to be appropriate as this would better represent potential changes through the reach from the LCD to the mouth of the Colorado River due to return flows.

The second method was to apply a sand transport rating curve, based on local sediment transport data, to predict concentration and flux of sand based solely on discharge. The sand rating curve was developed based on observed flow and sediment concentration at the Wharton USGS gauge (Station No. 08162000). Many of the suspended sediment samples also were sieved at 63 microns to separate the sand fraction from the fine-grained (silt and clay, washload) component. Because the interest in this evaluation is the sandy bed material, a rating curve was developed specifically for sand. The data and rating curve regression are shown in Figure 10.

Equation 1 was used along with the history of discharge (Q) to estimate the sand flux downstream of the outfall, both with and without the project.

$$\text{Sand Concentration} \left( \frac{mg}{L} \right) = 0.0009Q^{1.2626} \quad (1)$$

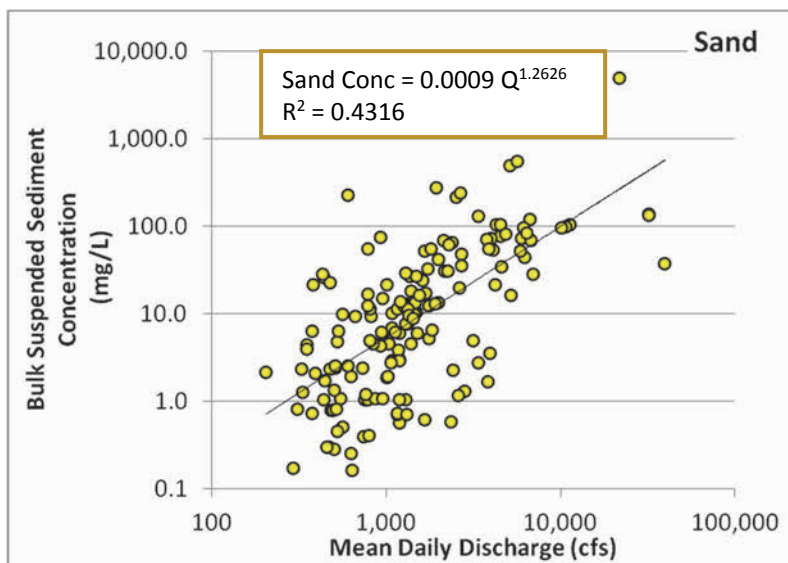
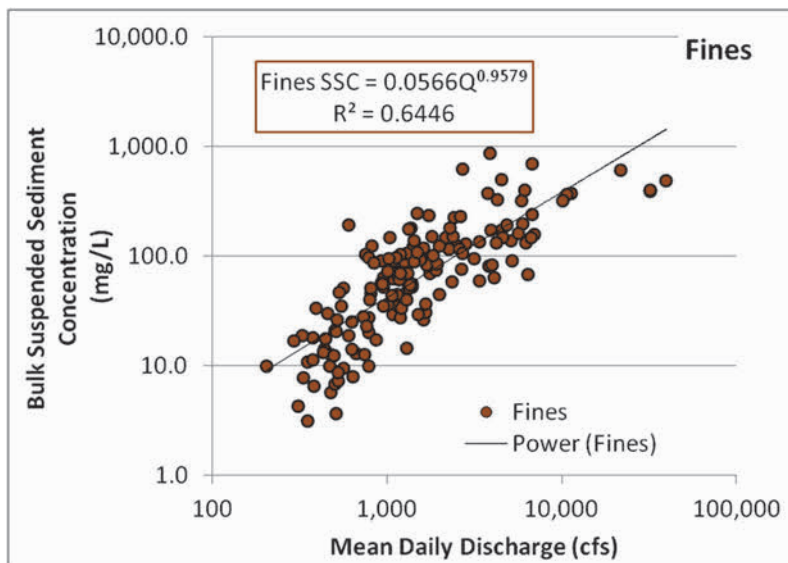
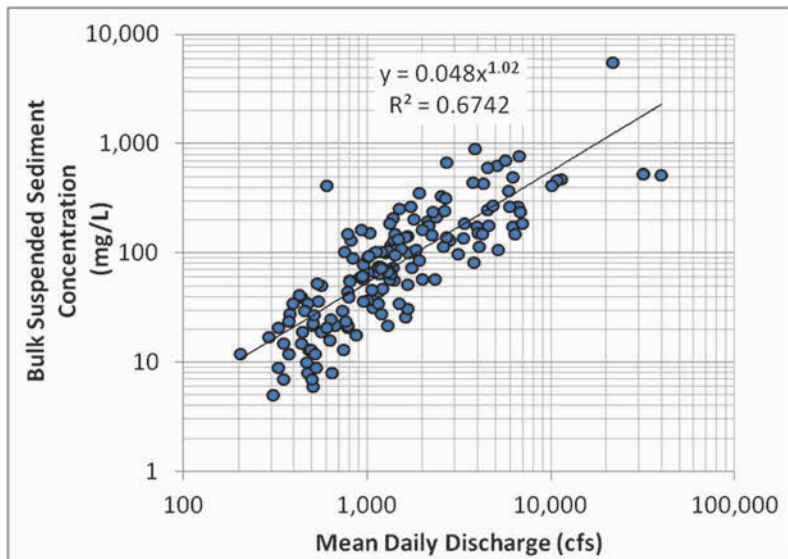


Figure 10. Bulk, Fines, and Sand Suspended Sediment Rating Curves Developed from Wharton USGS Gauge (Station No. 08162000) Data



## Results

Table 2 provides the annual predicted sediment flux using the Ackers and White method, as well as the sand rating curve for the period from 1940 through 2012 under with-project and without-project scenarios downstream of the river outfall.

TABLE 2  
**Annual and Cumulative Sediment Flux Predicted by Ackers-White Equation and Sand Rating Curve, with and without project**

	Q3 Sediment Transport, without project (Tons) <sup>a</sup>	Q3 Sediment Transport, with project (Tons) <sup>a</sup>
<b>Ackers-White</b>		
<b>Annual</b>		
<i>Maximum</i>	1,244,000	1,250,000
<i>Median</i>	65,000	63,000
<i>Minimum</i>	0	0
<i>Average</i>	121,000	119,000
<b>Cumulative Transport (1940 - 2012)</b>	8,836,000	8,690,000
<b>Rating Curve</b>		
<b>Annual</b>		
<i>Maximum</i>	5,560,000	5,563,000
<i>Median</i>	86,000	99,000
<i>Minimum</i>	1,000	1,000
<i>Average</i>	361,000	373,000
<b>Cumulative Transport (1940 - 2012)</b>	26,377,000	27,237,000

<sup>a</sup> The results of the equation in Imperial tons were converted to U.S. tons (rounded to the nearest thousand) for this table.

Average annual sediment flux downstream of the project for the without-project scenario is predicted to be approximately 121,000 tons/year by the Ackers and White method and approximately 361,000 tons/year using the sand rating curve. Average annual sediment flux for the with-project scenario is predicted to be approximately 119,000 tons/year by the Ackers and White method downstream of the project, which is a decrease of approximately 1.7 percent compared to the without-project scenario. The sand rating curve method for predicting fluxes predicts an increase in sediment flux of approximately 3.3-percent compared to without-project conditions. Although the two methods predict different magnitudes of sediment flux, the change in potential sediment transport capacity is within +/- 5 percent for each method, which is relatively small considering that annual sediment transport can vary by several orders of magnitude.

The predicted slight increase in sediment transport using the rating curve method is primarily related to the LBR releases that occur in the Riverware model during higher flow periods due to various monthly and annual water delivery requirements. At high flows, the rating curve sediment transport fluxes are greater than fluxes predicted by the Ackers-White equation. For this cumulative sediment analysis, these higher flow periods are characterized by the highest levels of sediment transport; therefore, even very small incremental increases in flow during these times add to the annual totals. The operation mode may or may not be similar to this model simulation once the project is operating. If this operation does change to fewer releases during relatively higher flow periods, then the difference between with- and without-project

sediment transports would be reduced and could even change to a slightly lower sediment transport with the project, as is predicted by the Ackers-White transport method.

Figure 11 shows the cumulative predicted sediment yield over the 72-year period of record for the with-project and without-project conditions. Although the magnitude of predicted sediment transport varies between methods, the relative change in transport between with- and without- project scenarios is estimated to be less than +/- 5 percent. The relative difference in sediment transport capacity between the with- and without-project scenarios is also less than the inter-year variability in capacity of sediment transport. Therefore the natural variability in sediment transport is expected to outweigh any project-related effects of sediment transport.

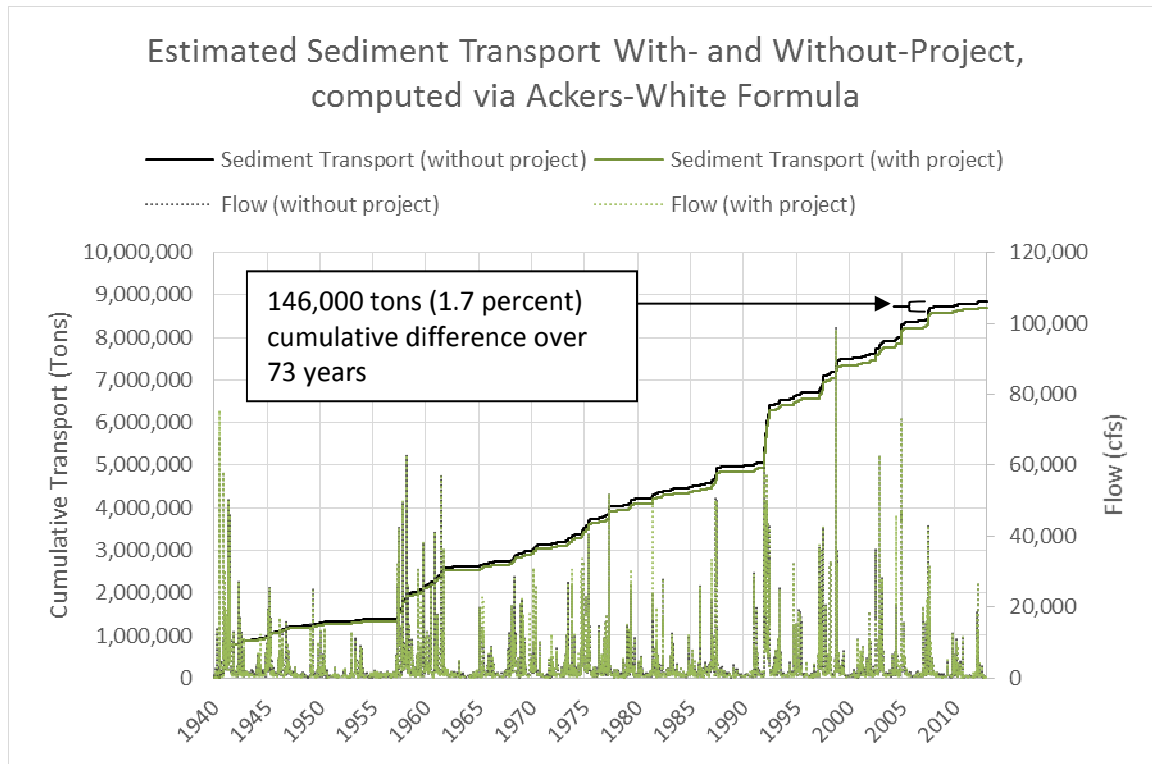


FIGURE 11  
**Comparison of With- and Without-Project Downstream Flow and Sediment Transport Capacity**

### Summary of Assessment

The lower Colorado River was historically characterized by a high sediment transport supply that contributed to the rapid development of point bars that would induce meandering and large-scale channel avulsions across the Texas Gulf coast plain (CH2M HILL, 2013a). The construction of upstream dams in the 1940s and 1950s decreased the rate of downstream channel meandering and provided indirect evidence that the constructed dams reduced the sediment supply to downstream reaches of the Colorado River (CH2M HILL, 2013a). Therefore, current conditions of the lower Colorado River are relatively static in comparison to the river’s dynamic past.

Previous analyses of sediment transport in the lower Colorado River identified frequent discharges, on the order of the 50 to 60 percent exceedance flow, as the discharge that conveys the greatest amount of sand-sized sediments over time (BIO-WEST, 2005). Phrased another way, flow in the Colorado River is sufficient to mobilize the sand bed of the project reach approximately half of the time.

Therefore, a sediment transport analysis was applied to assess the potential downstream impacts to sediment transport capacity for the project as a whole. The Ackers-White total sediment transport equation

and sediment rating curves developed from USGS measurements were used in conjunction with HEC-RAS modeling results (CH2M HILL, 2013b) to estimate downstream sediment transport capacity.

Analysis of the with- and without-project scenarios suggests that the proposed project would be expected to decrease sediment transport capacity approximately 1.7 percent compared to the without-project scenario using the Ackers-White transport equation. With-project sediment transport capacity would be expected to increase approximately 3.3 percent compared to the without-project scenario using the rating curve equation. These changes in sediment transport capacity are small in comparison to the natural variability in sediment transport capacity of the lower Colorado River that varies by orders of magnitude between years. Considering:

- the small change in transport capacity relative to natural variability,
- reduced channel migration following construction of upstream dams, and
- a total change in sediment transport capacity over the 72-year period of record that is within +/- 5 percent of without-project sediment transport and far less than the sediment transport capacity of the system during high-flow years,

the proposed project and associated diversions and releases are not expected to impact the channel morphology of downstream reaches.

## References

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- Yang. 1996. *Sediment Transport Theory and Practice*. McGraw-Hill. New York.

**Attachment A**  
**Historical Geomorphic Photos**

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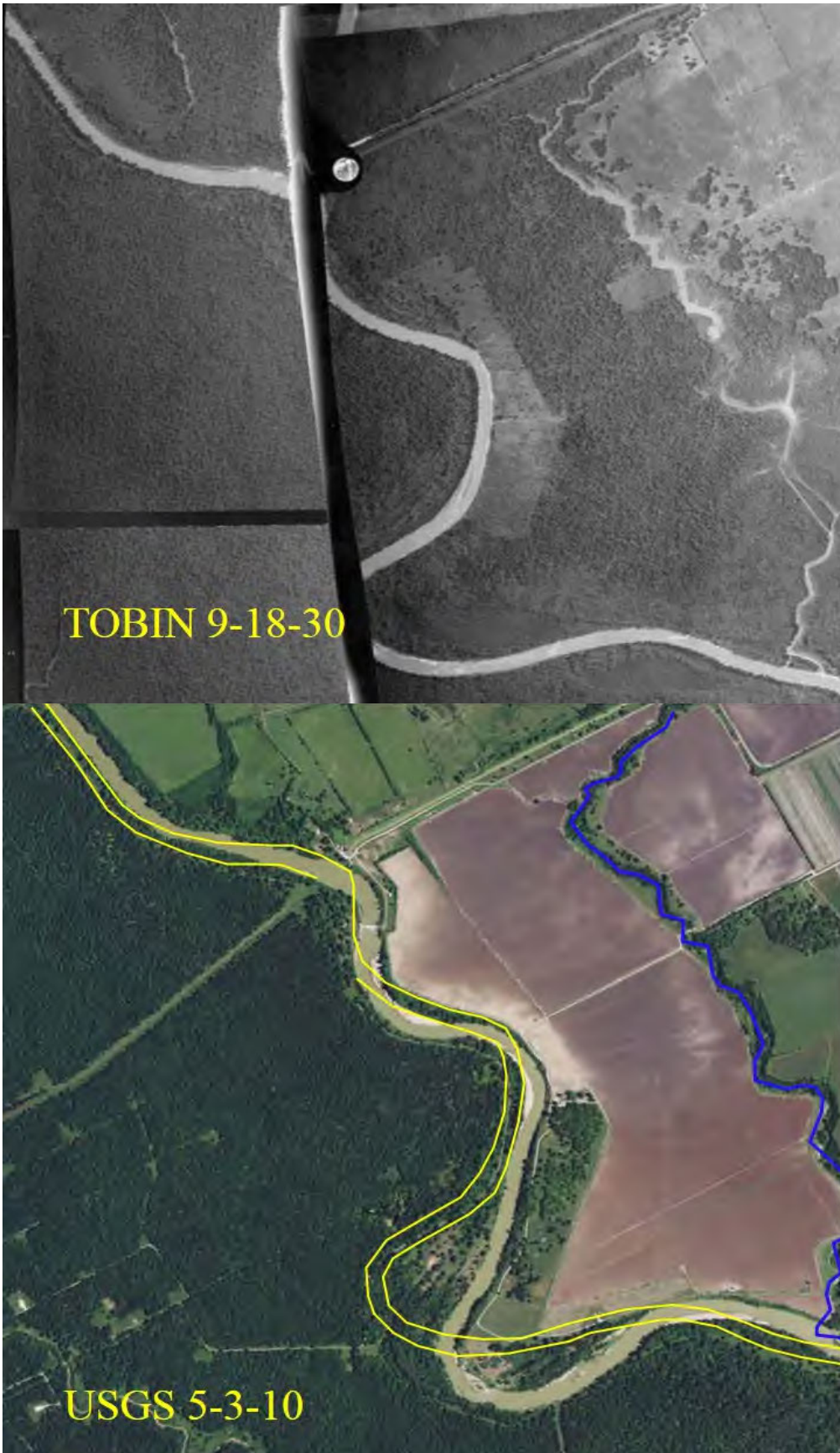


FIGURE A-1  
Historical aerial image of the Colorado River in 1930, before upstream flow control, and the same river reach in 2010.





FIGURE A-2  
Historical aerial image of the Colorado River in 1956, and the same river reach in 2010.





FIGURE A-3  
Historical aerial image of the Colorado River in 1962, and the same river reach in 2010.

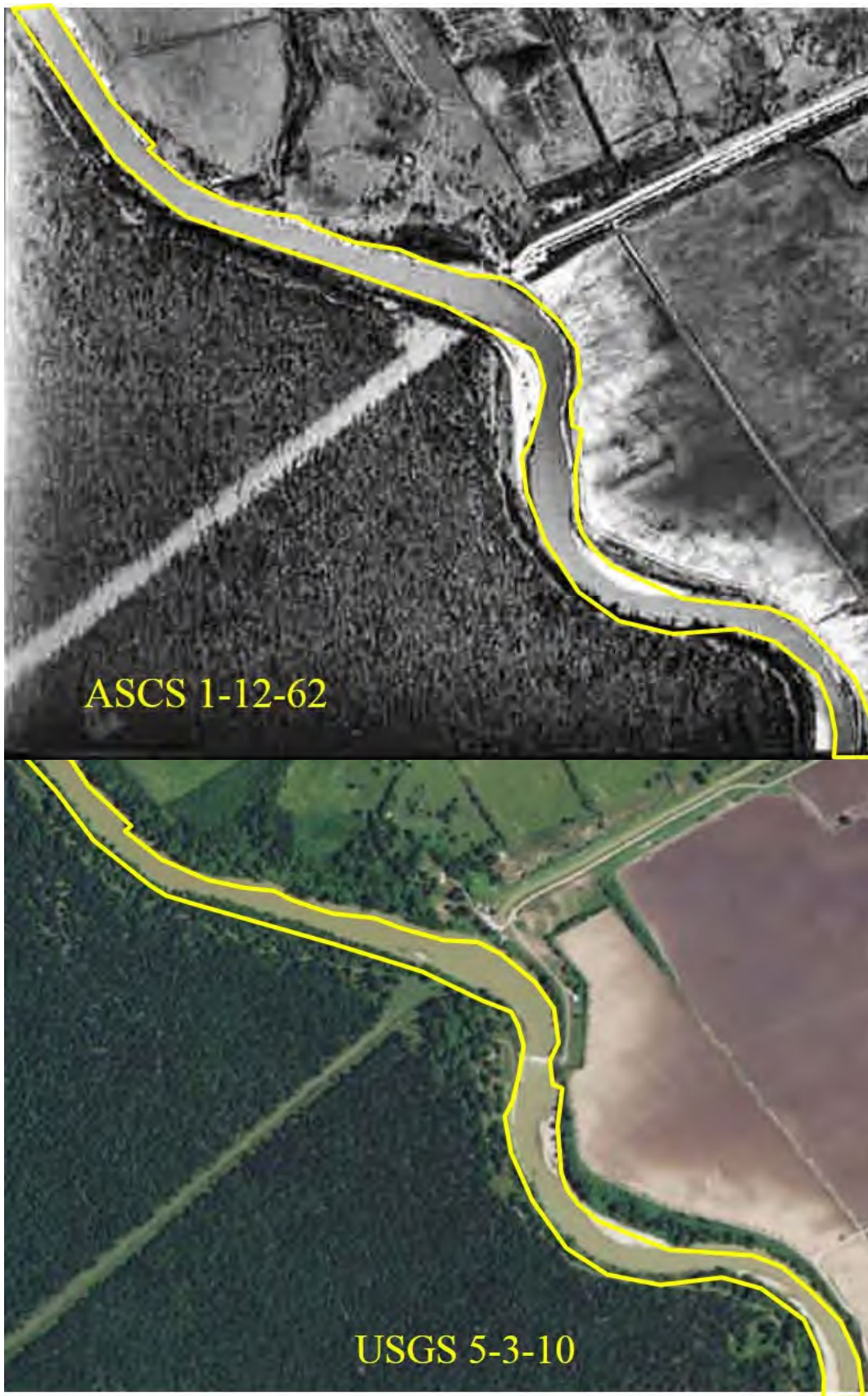


FIGURE A-4  
Historical aerial image of the Colorado River at the future Lane City Dam site in 1962, and the same river reach in 2010.





FIGURE A-5  
Historical aerial image of the Colorado River in 1972, and the same river reach in 2010.



FIGURE A-6  
Historical aerial image of the Colorado River at the future Lane City Dam site in 1972, and the same river reach in 2010.





FIGURE A-7  
Historical aerial image of the Colorado River in 1976, and the same river reach in 2010.



FIGURE A-8  
Historical aerial image of the Colorado River in 1989, and the same river reach in 2010.





**FIGURE A-9**  
**Historical aerial image of the Colorado River at the Lane City Dam site in 1989, and the same site in 2010.**



**FIGURE A-10**  
**Historical aerial image of the Colorado River in 1996, and the same river reach in 2010.**





**FIGURE A-11**  
**Historical aerial image of the Colorado River in 2004, and the same river reach in 2010.**

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## B. April 6, 2015 Update

# Lane City Reservoir Project – Update to Characterization of Off-Channel Reservoir Return Flows into the Colorado River and Implications for Channel Morphology

PREPARED FOR: Lower Colorado River Authority  
PREPARED BY: CH2M HILL  
COPY TO: File  
DATE: April 6, 2015  
PROJECT NUMBER: 491361

## Purpose

This technical memorandum (TM) provides an update to a TM prepared by CH2M HILL and issued on April 24, 2014 characterizing the geomorphic effects of return flows from the proposed off-channel Lane City Reservoir that will be constructed and operated as the key component of the Lane City Reservoir Project (project). The original TM described the larger geomorphic context of the project location, proposed return flow regime, and qualitative comparison of pre- and post-project conditions to estimate the change in sediment transport as a result of proposed return flows. This update addresses changes to the facility discharging off-channel reservoir (OCR) water to the Colorado River and assesses the impact of those changes to the conclusions of the original TM.

## Changes to the River Outfall

The river outfall design concept at the time of the April 24, 2014 TM employed a 15-foot diameter circular concrete stilling well in the river bed near shore, with a tremie apron area on the river bed surrounding the stilling well around its entire perimeter. Water discharged from the OCR would flow back toward the river in the existing canal, then be released to the river thru an 84-inch diameter pipe that would jet horizontally into the bottom of the stilling well. Much of the energy would be absorbed inside the stilling well, but the surrounding tremie slab would add further protection from river bed scour during discharges. The disturbed area of the river bank for this concept was planned to be backfilled and protected with grouted riprap.

Due to concerns about construction cost associated with excavation 15 or more feet below the river bottom, and the potential for settled solids and bedload to become impacted in the stilling well and affect its functionality, a new concept was developed for the river outfall. The new design employs a section of pipe (reducing from 84-inch to 60-inch diameter near the river's edge) projecting out of the river bank and elbowing down to discharge into a sheetpile stilling well with a tremie concrete floor. The sheetpile stilling well's dimensions are 23 feet by 23 feet (width and length) and the depth to its tremie slab floor is about 17 feet below the river bottom. As with the prior concept, there is still a tremie apron surrounding the sheetpile stilling well for added protection of the river bed, but the footprint of the apron has been reduced significantly and the riprap on the river bank has been replaced by a row of sheetpile.

The new design approach has been developed and refined in conjunction with a physical model built and tested at Utah State University. The dimensions and configuration of the pipe, stilling well, tremie floor, and surrounding tremie slab were fine-tuned during physical modeling to yield a design that will absorb the energy of the release water without creating scour or erosion problems in the river channel.

## Summary of Assessment

In the original TM characterizing the geomorphic effects of return flows from the proposed Lane City Reservoir, it was concluded that the proposed project and associated diversions and releases are not expected to impact the

channel morphology of downstream reaches. The changes to the river outfall as described above and as presented in the drawings issued April 2015 do not change this conclusion.

## References

CH2M HILL. 2014. *Lower Basin Reservoir Project – Characterization of Off-Channel Reservoir Return Flows into the Colorado River and Implications for Channel Morphology*. Prepared for Lower Colorado River Authority.



**Attachment 6**  
**Endangered and Threatened Species Summary**



## **ENDANGERED AND THREATENED SPECIES SUMMARY**

### **LOWER BASIN RESERVOIR PROJECT AT LANE CITY WHARTON COUNTY, TEXAS**

Prepared by:  
LCRA Environmental Affairs

January 29, 2014

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## **1.0 PROJECT DESCRIPTION**

LCRA plans to construct an off-channel storage reservoir in Wharton County, Texas. The current land use for the reservoir site is farmland. The off-channel reservoir will be constructed using suitable, on-site borrow material. Reservoir embankments will be approximately 40 feet above natural grade with a reservoir storage volume of approximately 40,000 acre-feet. The existing river pump plant, owned and operated by LCRA, will pump water from the river, when available, into the existing irrigation canal. A re-lift pump station will transfer water from the irrigation canal to the reservoir. LCRA will release water from the reservoir into the irrigation canal and either return it back to the river or distribute it through LCRA's irrigation canal system. The project area is adjacent and southwest of Lane City, Texas, west of State Highway (SH) 60, on County Road 120. The project area encompasses approximately 2100 acres that has historically produced cotton, sorghum and turf grass. Some areas of the property are also improved pastures.

## **2.0 METHODOLOGY**

Various published and nonpublished references were used during the preparation of this summary, including publications, maps, database resources, and surveys. To determine federally and state-listed endangered, threatened, and other rare species of potential occurrence in the project area, staff consulted county-level sensitive species lists maintained by the U.S. Fish and Wildlife Service (FWS) and Texas Parks and Wildlife Department (TPWD). Staff also performed a literature search and map review of TPWD's Texas Natural Diversity Database (TXNDD). On-site field investigations to identify potential Bald Eagle habitat were conducted by LCRA staff members Brent Hunt and Keith Otto on October 4, 2012. Since the initial field investigation, LCRA staff and contractors have continued on-site assessment activities to support the design and permitting efforts for the project. In December 2013, a freshwater mussels survey was conducted in and adjacent to the project area in the Colorado River.

## **3.0 RESULTS**

According to lists maintained by FWS and TPWD, 19 federally and state-listed endangered or threatened species potentially occur in Wharton County (Texas Parks and Wildlife Department (TPWD) 2011; U.S. Fish and Wildlife Service (FWS) 2012a). These species are listed in Table 1, and include four federally listed endangered, one federally listed threatened, five federal candidate species, and nine state-listed threatened species. Inclusion on this list does not imply that a species occurs in the project area, but rather acknowledges the potential for its occurrence in Wharton County. Only those species listed as endangered or threatened by FWS have federal protection under the Endangered Species Act (ESA). State listing of species protects only individual organisms, not their respective habitats. The following subsections provide descriptions of endangered, threatened, and rare species of potential occurrence in the project area.

**TABLE 1. ENDANGERED AND THREATENED SPECIES OF POTENTIAL OCCURRENCE IN WHARTON COUNTY, TEXAS<sup>1</sup>**

Common Name <sup>2</sup>	Scientific Name <sup>2</sup>	Status <sup>3</sup>	
		FWS	TPWD
<b>BIRDS</b>			
Attwater's Greater Prairie-Chicken	<i>Tympanuchus cupido attwateri</i>	E	E
Whooping Crane	<i>Grus americana</i>	E	E
Least Tern (Interior population)	<i>Sternula antillarum</i>	E <sup>4</sup>	E
Sprague's Pipit	<i>Anthus spragueii</i>	C <sup>4</sup>	NL
Bald Eagle	<i>Haliaeetus leucocephalus</i>	DL	T
Peregrine Falcon	<i>Falco peregrines</i>	DL	T
Wood Stork	<i>Mycteria americana</i>	NL	T
White-faced Ibis	<i>Plegadis chihi</i>	NL	T
White-tailed Hawk	<i>Buteo albicaudatus</i>	NL	T
<b>MOLLUSKS</b>			
Smooth pimpleback	<i>Quadrula houstonensis</i>	C <sup>4</sup>	T
Texas pimpleback	<i>Quadrula petrina</i>	C <sup>4</sup>	T
Texas fawnsfoot	<i>Truncilla macrodon</i>	C <sup>4</sup>	T
<b>FISHES</b>			
Blue sucker	<i>Cycleptus elongates</i>	NL	T
Sharpnose shiner	<i>Notropis oxyrhynchus</i>	C <sup>4</sup>	NL
<b>MAMMALS</b>			
Red wolf (extirpated)	<i>Canis rufus</i>	E <sup>4</sup>	E
Louisiana black bear	<i>Ursus americanus luteolus</i>	T <sup>4</sup>	T
<b>REPTILES</b>			
Texas horned lizard	<i>Phrynosoma cornutum</i>	NL	T
Timber rattlesnake	<i>Crotalus horridus</i>	NL	T

<sup>1</sup> According to TPWD (2012) and FWS (2012).

<sup>2</sup> Nomenclature follows Hubbs et al. (1991, 2008), (AOU (1998, 2000, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, and 2012), Crother et al. (2008), Manning et al. (2008), TPWD (2011), and FWS (2012a).

<sup>3</sup> FWS – U.S. Fish and Wildlife Service; TPWD – Texas Parks and Wildlife Department

E – Endangered

T – Threatened

C – Candidate for federal listing as endangered or threatened

DL – Federally delisted

NL – Not listed

<sup>4</sup> TPWD (2011) include these federally listed endangered or threatened species on their annotated county list of rare species for the project area county; however, FWS (2012a) does not acknowledge these species' presence in Wharton County and, therefore, does not include these species on their respective county species list. No seasonal construction/maintenance restrictions would apply with regard to these species. Additionally, these species would not trigger a pre-construction notification (PCN) to the USACE when using a Nationwide Permit (NWP).

### 3.1 BIRDS

The federally listed (endangered) Attwater's Greater Prairie-Chicken (*Tympanuchus cupido attwateri*), a subspecies of the Greater Prairie-Chicken (*T. cupido*), was formerly abundant on the Gulf coastal prairies of Texas and Louisiana, but at present-day fewer than 90 individuals remain and it is arguably the most endangered species in Texas (Schroeder and Robb 1993; Lockwood and Freeman 2004, FWS 2010). Only three wild populations of the species remain within refuges in Colorado and Galveston counties, and on a private ranch in Goliad County (FWS 1992; Lockwood and Freeman 2004, FWS 2010). Historic habitat consisted of native Gulf coastal short-grass prairie; however, currently occupied habitat consists of relict native prairie intermixed with cropland (Schroeder and Robb 1993). FWS (2012a) indicates the species is of potential occurrence in Wharton County; however, this inclusion is based on historic records and no recent records exist from the county. The species is almost certainly restricted to the aforementioned sites. Given the extremely restricted range of this species, it is unlikely to occur in the project area and, therefore, it is unlikely that the project would adversely affect this species.

The federally listed (endangered) Whooping Crane (*Grus americana*) is a large wading bird that, in the last 50 years, has returned from the brink of extinction. Currently, three wild populations of Whooping Crane exist, the largest of which is the self-sustaining Aransas/Wood Buffalo population, which breeds in Wood Buffalo National Park in northern Canada and migrates annually to Aransas National Wildlife Refuge and adjacent areas of the central Texas coast in Aransas, Calhoun, and Refugio counties where it winters (Lewis 1995; Stehn 2009). A second, smaller migratory wild population (Eastern Migratory Flock) breeds in Wisconsin and migrates annually to Florida (Stehn 2009). In addition, a smaller nonmigratory wild population occurs in Florida (Lewis 1995; Stehn 2009). During migration, Whooping Cranes frequently stopover at wetlands and pastures to roost and feed. It is possible that Whooping Cranes could occur in the general area during migration, as the project area is within the migration corridor of this species (Tacha et al. 2008); however, it is unlikely that they would occur in the project area for any extended period. The project is unlikely to result in adverse effects to this species, as it is not likely to decrease the amount of available migratory stopover habitat, but rather may provide additional stopover habitat.

In Texas, the federally listed (endangered) interior population of the Least Tern (*Sternula antillarum*—formerly *Sterna antillarum*) historically nested on sandbars of the Colorado River, Red River, and Rio Grande. At present time, only small breeding populations exist at isolated locations within the species' historic range, although its winter range includes the entire Texas Gulf Coast. The interior Least Tern's preferred nesting habitat consists of unvegetated, frequently flooded sand flats, salt flats, sand and gravel bars, and sand, shell, and/or gravel beaches (Campbell 1995; Thompson et al. 1997). No documented records of interior Least Terns exist within the project area county (Oberholser 1974, TPWD 2012). No suitable nesting, roosting, or foraging habitat occurs within the project area; however, it is possible that individuals could occasionally pass through the general area during migration. Thus, it is unlikely that the project would adversely affect this species.

Sprague's Pipit (*Anthus spragueii*) is currently a candidate species for federal listing as endangered or threatened. Sprague's Pipit is an uncommon migrant and rare to local winter resident throughout central Texas (Lockwood and Freeman 2004). The species prefers well-drained areas in open grasslands, where even low densities of shrubs are avoided (Robbins and Dale 1999). In migration and on wintering grounds, Sprague's Pipits may also inhabit stubble and fallow fields (Robbins and Dale 1999). Lockwood and Freeman (2004) indicate that



Wharton County is within the migratory corridor of the species and, therefore, the species could occur as a transient during spring or fall, but is unlikely to reside there. While the proposed project could result in a slight decrease in wintering habitat through inundation of agricultural lands, any such decrease would be negligible when compared to the overall amount of suitable habitat in the general area. Thus, it is unlikely that the project would adversely affect this species.

The state-listed (threatened) Bald Eagle (*Haliaeetus leucocephalus*) is a rare and local summer resident in the eastern third of Texas, where it breeds along the Gulf Coast and on major inland lakes and reservoirs (Buehler 2000; Lockwood and Freeman 2004). During migration and winter, the species is more widely distributed, occurring primarily in the northern two-thirds of the state (Buehler 2000; Lockwood and Freeman 2004). Bald Eagles prefer large bodies of water (i.e., major rivers, lakes, reservoirs, and bays) surrounded by tall trees or cliffs, which they use as nesting and roosting sites. According to Ortego (2003, 2009) and TPWD (2012, 2014), Bald Eagle nesting records exist from Wharton County, particularly along the Colorado River. According to Brent Ortego (Wildlife Diversity Biologist, TPWD), the optimal time to look for Bald Eagle nests is during the fall or winter, when fewer leaves are on trees. LCRA staff evaluated the project area for potential Bald Eagle habitat during an October 4, 2012 field trip. Subsequently, LCRA staff and contract personnel have visited the site on numerous occasions. According to LCRA's assessment and subsequent site observations, suitable habitat occurs only within the western portion of the project area near the Colorado River and Jarvis Creek and in the area south of an unnamed tributary to Jarvis Creek, where large enough trees exist to support a nest. During the October 2012 field trip and subsequent site visits, LCRA did not identify any eagle nests in these locations. Suitable habitat for Bald Eagles also occurs on the property west of the Colorado River, across from the project area. LCRA staff have had limited access to the property across the river from the project area to assess the condition of the Lane City Dam. Bald Eagles are known to be present on the property, which encompasses several thousand acres; however, no Bald Eagle nests have been observed within a 660-foot radius of the project area boundary. The 660-foot radius of potential concern has been designated by FWS for construction activities similar to those planned for the Lower Basin Reservoir Project (FWS 2007). While Bald Eagles may occur in the general area, and potential nesting habitat is present, the proposed project is unlikely to result in adverse effects to this species, provided no nests are present within 660 feet of the project area during construction.

The state-listed (threatened) Peregrine Falcon (*Falco peregrinus*) is a rare to uncommon migrant statewide, an uncommon winter resident on the Texas Gulf Coast, and a rare and localized summer resident in the mountains of Trans-Pecos Texas, (Lockwood and Freeman 2004). Peregrine Falcons may occupy a wide variety of habitat types, particularly in migration. Peregrine Falcons are of potential occurrence in the general area, particularly during migration; however, it is unlikely that the project would adversely affect the species, since no nesting, roosting, or foraging habitat would be affected. Conversely, it is possible that the project could provide additional foraging habitat for the species.

The state-listed (threatened) Wood Stork (*Mycteria americana*), a large wading bird, is an uncommon to locally common post-breeding visitor to coastal Texas and inland waters in east and central Texas (Lockwood and Freeman 2004). Wood Storks historically bred in North America along the Gulf Coast from east Texas to Florida, but their range has been significantly reduced since the 1960s and their North American breeding range is now restricted to Florida, Georgia, and South Carolina (Oberholser 1974; Coulter et al. 1999). FWS lists the Wood Stork as federally endangered in Florida, Alabama, Georgia, North Carolina, and South Carolina, but

not in Texas. In Texas, Wood Storks typically occur near freshwater or saltwater wetlands, lakes, or along rivers and streams. Transient individuals may potentially occur in the general area; however, it is unlikely that the project would adversely affect this species, since it would not affect any nesting, roosting, or foraging habitat. Conversely, it is possible that the off-channel reservoir could provide additional foraging habitat for the species.

The state-listed (threatened) White-faced Ibis (*Plegadis chihi*) is a medium-sized wading bird that inhabits freshwater marshes, sloughs, and irrigated rice fields, but also frequents brackish and saltwater habitats (Ryder and Manry 1994). White-faced Ibis are permanent residents along the Texas Gulf Coast; however, nesting records exist for many scattered inland localities (Lockwood and Freeman 2004). The species is a rare to uncommon migrant throughout the state and occasionally occurs as a post-breeding visitor north and west of its typical range. The species is of potential occurrence in the general area, particularly as a transient; however, it is unlikely that the project would adversely affect this species, since it would not affect any nesting, roosting, or foraging habitat. Conversely, it is possible that the project could provide additional foraging habitat for the species.

The state-listed (threatened) White-tailed Hawk (*Buteo albicaudatus*) is an uncommon local resident on the Gulf coastal plain of Texas, ranging from Harris County south to the Rio Grande (Lockwood and Freeman 2004). White-tailed Hawks inhabit coastal prairies and brushlands, as well as inland mesquite and oak savannahs (Farquhar 1992). TPWD (2011) identifies the species as potentially occurring in Wharton County and the project area is within the normal breeding range of the species. It is possible that White-tailed Hawks could occur in the project area; however, it is unlikely that the project would adversely affect this species, since it will not likely affect any nesting, roosting, or foraging habitat for the species.

## 3.2 MOLLUSKS

### 3.2.1 Freshwater Mussels Survey

On December 4, 2013, a crew of five LCRA and BioWest, Inc. biologists conducted a survey for live freshwater mussels in the Colorado River segment that is within and in proximity to the project area boundary. Multiple 20-minute searches were conducted in the survey area until the survey team felt that the area had been sufficiently covered. At the end of each 20-minute search, mussels were compiled, identified, enumerated, photographed, and returned to the river near their initial location. Prior to initiating the survey, LCRA consulted with TPWD staff regarding the scope of the survey.

During the survey, a total of 6 person-hours of search time resulted in the capture of 58 live mussels. Most of the mussels were located on the eastern side of the river within deeper waters with more stable mud substrate behind current breaks such as large rocks, woody debris, or erosion control pilings. A summary of the mussels found during the survey is provided in Table 2 below. No federally listed endangered or threatened mussel species were identified during the survey.

**TABLE 2. FRESHWATER MUSSELS FOUND WITHIN  
AND IN PROXIMITY TO THE PROJECT AREA BOUNDARY**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Listing Status</b>	<b>Number Collected</b>
Threeridge	<i>Amblema plicata</i>	None	43
Smooth pimpleback	<i>Quadrula houstonensis</i>	State-threatened, federal candidate	10
Tampico pearlymussel	<i>Cyrtonaias tampicoensis</i>	None	1
Bleufer	<i>Potamilus purpuratus</i>	None	2
Yellow sandshell	<i>Lampsilis teres</i>	None	1
Lilliput	<i>Toxolasma parvum</i>	None	1
<b>Total Number of Individuals</b>			<b>58</b>

Since live freshwater mussels were located in and immediately adjacent to areas in the river where dewatering and construction work are planned, LCRA will develop and implement an Aquatic Resource Relocation Plan to relocate mussels from the project area prior to and during construction activities. LCRA will submit the plan to TPWD for review and approval.

### **3.2.2 Literature Review**

The state-listed (threatened) and federal candidate species, the smooth pimpleback (*Quadrula houstonensis*), is a moderately large freshwater mussel that inhabits mixed mud, sand, and fine gravel substrates. The species occurs in small to moderate streams and rivers in the Colorado, Brazos, and San Jacinto river basins (Howells et al. 1996; TPWD 2011), and recent records exist from the Colorado River near Wharton (Burlakova et al. 2011, 2012). The species is intolerant of dramatic water level fluctuations. As is noted in Section 4.2.1, live smooth pimpleback mussels have been identified in the Colorado River within and adjacent to the project area.

The state-listed (threatened) and federal candidate species, the Texas pimpleback (*Quadrula petrina*), is a moderately large freshwater mussel that can inhabit slow flowing rivers and streams with mud or gravel substrates, or moderately flowing streams and rivers with sand and gravel substrates (Howells et al. 1996; TPWD 2011). Suitable habitat for this species is likely within the project area; however, none were identified in the Colorado River within or adjacent to the project area during the December 2013 mussels survey.

The state-listed (threatened) and federal candidate species, the Texas fawnsfoot (*Truncilla macrodon*), is a medium-sized freshwater mussel that likely occurs in rivers and larger streams, including irrigation canals (TPWD 2011). The species occurs in the Trinity, Colorado, and Brazos river basins (Howells et al. 1996; TPWD 2011), and recent records exist from the Colorado River near Wharton (Burlakova et al. 2011, 2012). Suitable habitat for this species is likely within the project area; however, none were identified in the Colorado River within or adjacent to the project area during the December 2013 mussels survey.

### 3.3 FISHES

The state-listed (threatened) blue sucker (*Cycoreptus elongatus*) is a large freshwater species that inhabits large rivers from the Rio Grande in Texas, New Mexico, and Mexico, east and north to the Mississippi, Missouri, and Ohio River basins (Lee et al. 1980). Blue suckers typically inhabit river channels and pools with moderate stream flow where the channel bottom consists of exposed bedrock, hard clay, sand, and gravel. In Texas, blue sucker records exist from the Red, Sabine, Neches, Brazos, Colorado, San Marcos, Frio, and Nueces rivers (Lee et al. 1980; Hassan-Williams and Bonner 2008). Extensive fish surveys and habitat mapping identified a large riffle/rapid complex immediately below the Lakeside Diversion point that provides substantial blue sucker habitat (Mosier and Ray 1992, BIO-WEST 2008). This area is the furthest downstream that habitat has been documented, however, it is possible that suitable habitat may exist further downstream, e.g. near the Garwood diversion, but no known survey data is available for that reach to date.

The federal candidate species sharpnose shiner (*Notropis oxyrhynchus*) inhabits sand and gravel runs of medium to large rivers but is less often found in sand or mud bottomed pools (Page et al. 1991). Flowing water is a requirement for successful reproduction. The saline and turbid waters of the Upper Brazos River are typical habitat for the species. Historically, sharpnose shiner occurred throughout the main stem of the Brazos River and several of its major tributaries, including the Navasota River, and the Salt and Double Mountain Forks of the Brazos River (Upper Brazos Drainage). The sharpnose shiner has also been found in the Wichita River (within the Red River Basin), where it may have once naturally occurred but has since been extirpated. The sharpnose shiner is likely extirpated from the river downstream of Possum Kingdom Reservoir and is in apparent decline in the Upper Brazos. Hubbs et al. (1991) state that a presumed introduced population exists in the Colorado River above Buchanan Reservoir; however, the validity of this population is still in question (Moss and Mayes 1993). It is remotely possible, but unlikely, that the sharpnose shiner occurs in the lower Colorado River basin.

### 3.4 MAMMALS

The federally listed (endangered) red wolf (*Canis rufus*) formerly occurred in the eastern half of Texas, where it inhabited a variety of wooded habitats including pine forests, bottomland hardwood forests, swamps, marshes, and coastal prairies (Schmidly 2004). The project area is within the historic range of the species; however, most authorities consider the red wolf extirpated in Texas (Schmidly 2004). Thus, it is unlikely that the project would adversely affect this species.

The federally listed (threatened) Louisiana black bear (*Ursus americanus luteolus*), a subspecies of the American black bear (*Ursus americanus*), historically inhabited east Texas, Louisiana, and southern Mississippi, but is now confined to small numbers in Mississippi and Louisiana (57 FR 588–595). The last east Texas record of native black bear is from the late 1950s, near the town of Livingston in Polk County (Fleming 1980). Periodic reports of black bears exist from various east Texas counties; however, these bears most likely represent individuals dispersing from neighboring areas in Louisiana (Taylor 2000). Louisiana black bears require large areas of undisturbed forest habitat, which is largely absent in the project area. Additionally, Wharton County is outside of the known range of this species (Garner 1996). Thus, it is unlikely that the project would adversely affect this species.

### 3.5 REPTILES

The state-listed (threatened) Texas horned lizard (*Phrynosoma cornutum*) occurs throughout the western two-thirds of the state in a variety of habitats, but prefers arid to semiarid habitats in sandy loam or loamy sand soils that support patchy bunch grasses, cacti, yucca, and various shrubs (Henke and Fair 1998; Dixon 2000). Harvester ants (*Pogonomyrmex* spp.) are the primary prey of Texas horned lizards and some authorities (Whitford and Bryant 1979; Donaldson et al. 1994; McIntyre 2003) suggest that the presence of harvester ants at a locality is a primary factor in determining whether the area might contain horned lizards. Dixon (2000) shows historic records from Wharton County; however, TPWD (1998) indicates strong evidence of population declines in this part of the state. According to Donaldson et al. (1994), with the exception of small isolated populations, the species is no longer present east of an imaginary line from Fort Worth to Corpus Christi. LCRA staff did not identify any suitable habitat for this species within the project area and it is unlikely that the project would adversely affect this species.

The state-listed (threatened) timber rattlesnake (*Crotalus horridus*) occurs in the eastern third of the state, where it typically inhabits bottomland forests, mesic woodlands, palmetto groves, cane thickets, and brushy fields, especially where dense vegetation grows just above ground level (Werler and Dixon 2000). Dixon (2000) shows documented records from Wharton County. Because the project area consists primarily of agricultural lands, little to no suitable habitat is present within the project area; therefore, it is unlikely that the project would adversely affect this species.

## 4.0 SUMMARY AND REQUIREMENTS

This section addresses the project's potential effects on sensitive wildlife identified in the preceding sections, provides recommendations for minimizing or avoiding adverse effects, and identifies applicable regulatory requirements.

### 4.1 FEDERALLY LISTED SPECIES

No suitable habitat for any federally listed endangered or threatened species exists within or adjacent to the project area. Federally listed and candidate migratory species such as the Whooping Crane, interior Least Tern, and Sprague's Pipit are unlikely to reside in the project area; however, individuals could pass through the project area during migration. The proposed project is unlikely to result in adverse effects on these species. Suitable habitat for the federal candidate mussel species smooth pimpleback, Texas pimpleback, and Texas fawnsfoot exists within the project area. Live freshwater mussels, including smooth pimpleback mussels, were located in and immediately adjacent to areas in the Colorado River where dewatering and construction work are planned. Therefore, an Aquatic Resource Relocation Plan will be developed and implemented to relocate mussels from the project area prior to and during construction activities. LCRA will submit the plan to TPWD for review and approval.

### 4.2 STATE-LISTED SPECIES

State-listed endangered or threatened species of potential occurrence within the project area include the Texas horned lizard, and timber rattlesnake; however, the proposed activities are unlikely to adversely affect these species, or any other state-listed species discussed above. In addition, state-listed migratory species such as the Peregrine Falcon, White-faced Ibis, Wood

Stork, and White-tailed Hawk may potentially occur within the general area; however, the proposed activities are unlikely to adversely affect these species, as none are expected to reside within or adjacent to the project area. While no legal protection of habitat exists for these species, state law protects individuals from "take."

Bald Eagles may occur in the general area and potential nesting habitat is present within the project area; however, no Bald Eagle nests are present within the project area or within a 660-foot radius beyond the project area boundary. The proposed project is unlikely to result in adverse effects to this species, provided no nests are present during construction activities. LCRA will continue to monitor the project area for Bald Eagle nests. If a nest is identified within the project area, LCRA will coordinate with FWS regarding the potential for adverse effects, if deemed appropriate and necessary.

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**Attachment 7**  
**Water Quality Certification Form**



# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

## Tier I (Small Projects) Checklist

Incorporation of Best Management Practices (BMPs) into a proposed project will allow an individual Section 404 permit application to proceed without further review by the Texas Commission on Environmental Quality (TCEQ). The basic standards for the BMPs described in items I-III are included in this packet. Tier I projects are those which will result in a direct impact of three acres or less of waters in the state or 1500 linear feet of streams. If a project has a combination of impacts that exceed the threshold or is submitted after the fact, it does not qualify as a Tier project (one acre of impact is considered equal to 500 linear feet of stream). The provisions of the checklist, including BMPs selected by an applicant, will become part of the Section 404 permit. If an applicant fails to implement these provisions and BMPs, the permit is subject to enforcement. Applicants who do not wish to incorporate all the provisions of the checklist into their project or desire to use alternatives may seek individual 401 review and certification from the TCEQ.

### **I. Erosion Control**

Disturbed areas must be stabilized to prevent the introduction of sediment to adjacent wetlands or water bodies during wet weather conditions (erosion). *At least one* of the following BMPs must be maintained and remain in place until the area has been stabilized. Please check the BMP(s) you will incorporate into your project.

- Temporary Vegetation
- Blankets/Matting
- Mulch
- Sod
- Erosion Control Composts\*
- Compost Filter Berms and Socks\*
- Mulch Filter Berms and Socks\*

### **II. Post-Construction TSS Control**

After construction has been completed and the site is stabilized, total suspended solids (TSS) loadings shall be controlled by *at least one* of the following BMPs. Please check the BMP(s) you will incorporate into your project.

- Retention/Irrigation
- Extended Detention Basin
- Vegetative Filter Strips
- Constructed Wetlands
- Wet Basins

### **III. Sedimentation Control**

Prior to project initiation, the project area must be isolated from adjacent wetlands and water bodies by the use of BMPs to confine sediment. *At least one* of the following BMPs must be maintained and remain in place until project completion. Please check the BMP(s) you will incorporate into your project.

- Sand Bag Berm
- Silt Fence
- Triangular Filter Dike
- Rock Berm
- Hay Bale Dike
- Erosion Control Compost\*
- Compost Filter Berms and Socks\*
- Mulch Filter Berms and Socks\*

Dredged material shall be placed in such a manner that prevents sediment runoff into water in the state, including wetlands. Water bodies can be isolated by the use of one or more of the required BMPs identified for sedimentation control. These BMPs must be maintained and remain in place until the dredged material is stabilized.

Hydraulically dredged material shall be disposed of in contained disposal areas. Effluent from contained disposal areas shall not exceed a TSS concentration of 300 mg/L.

### **IV. Contaminated Dredge Material**

If contaminated dredge material that was not anticipated or provided for in the permit application is encountered during dredging, operations shall cease immediately. Pursuant to §26.039 (b) of the Texas Water Code, the individual operating or responsible for the dredging operations shall



notify the commission's emergency response team at (512)463-7727 as soon as possible, and not later than 24 hours after the discovery of the material. The applicant shall also notify the U.S. Army Corps of Engineers (Corps) that activities have been temporarily halted. Contaminated dredge material shall be remediated or disposed of in accordance with TCEQ rules. Dredging activities shall not be resumed until authorized in writing by the Commission.

"Contaminated dredge material" is defined as dredge material which has been chemically, physically, or biologically altered by man-made or man-induced contaminants which include, but not limited to "solid waste", "hazardous waste", and "hazardous waste constituent" as those terms are defined by 30 Texas Administration Code (TAC) Chapter 335, "Pollutants" as defined by Texas Water Code § 26.001 and "Hazardous Substances" as defined in the Texas Health and Safety Code, §361.003.

#### **V. Wetland Mitigation Requirements**

Where wetland mitigation is determined to be necessary by the Corps, the applicant must satisfy the minimum success criteria established by the Corps including wetland hydrology, hydrophytic vegetation, and two years of monitoring. If that criteria includes less than two years of monitoring, the applicant may request water quality certification under Section 401.

#### **\*VI. Compost Requirements**

New types of erosion control compost (ECC) and compost and mulch filter berms and socks are continuously being developed. The Texas Department of Transportation (TxDOT) has established minimum performance standards which must be met for any products seeking to be approved for use within any of TxDOT's construction or maintenance activities. Material used within any TxDOT construction or maintenance activities must meet material specifications in accordance with current TxDOT specifications. TxDOT maintains a website at [http://www.txdot.gov/business/contractors\\_consultants/recycling/compost\\_row.htm](http://www.txdot.gov/business/contractors_consultants/recycling/compost_row.htm) that provides information on Use of Compost and Shredded Wood on Rights of Way. This website also contains information on areas where the TCEQ restricts the use of certain compost products.

ECC and compost and mulch filter berms and socks used for projects not related to TxDOT should also be of quality materials by meeting performance standards and compost specification data. To ensure the quality of compost used as an ECC, products should meet all applicable state and federal regulations, including but not limited to the United States Environmental Protection Agency (USEPA) Code of Federal Regulations (CFR), Title 40, Part 503 Standards for Class A biosolids and Texas Natural Resource Conservation Commission (now named TCEQ) Health and Safety Regulations as defined in the TAC, Chapter 332, and all other relevant requirements for compost products outlined in TAC, Chapter 332. Testing requirements required by the TCEQ are defined in TAC Chapter 332, including Sections §332.71 Sampling and Analysis Requirements for Final Products and §332.72 Final Product Grades. Compost specification data approved by TxDOT are appropriate to use for ensuring the use of quality compost materials or for guidance.

Testing standards are dependent upon the intended use for the compost and ensures product safety, and product performance regarding the product's specific use. The appropriate compost sampling and testing protocols included in the United States Composting Council (USCC) Test

Methods for the Examination of Composting and Compost (TMECC) should be conducted on compost products. TMECC information can be found at <http://www.tmecc.com/>. The USCC Seal of Testing Assurance (STA) program contains information regarding compost STA certification. STA program information can be found at <http://compostingcouncil.org/section.cfm?id=35>.

**VII. Coastal Zone Management Act**

In accordance with 31 TAC §506, all projects located in the coastal zone boundary shall be consistent with the Texas Coastal Management Program.

Applicant should sign and return the original statement and completed checklist to the U.S. Army Corps of Engineers and send a copy to the TCEQ. Questions regarding the checklist should be directed to the TCEQ.

U.S. Army Corps of Engineers  
Regulatory Branch  
Galveston District Office  
P.O. Box 1229; Galveston, TX 77553-1229  
Fax: \_\_\_\_\_

Water Quality Assessment Section - 401 Coordinator  
Texas Commission on Environmental Quality  
MC-150  
P.O. Box 13087  
Austin, Texas 78711  
(512) 239-4671  
Fax (512)239-4420

Applicant's Name (please print): Lower Colorado River Authority

Corps Project Manager or Regulatory Specialist (if known):  
Mr. Jayson Hudson

Permit Number (if known): \_\_\_\_\_

I will incorporate all of the above requirements and selected BMPs (Items I, II, and III) into my proposed project. I understand that these requirements and BMPs as described above will be part of my Section 404 permit, and failure to implement any of them will constitute a permit violation.

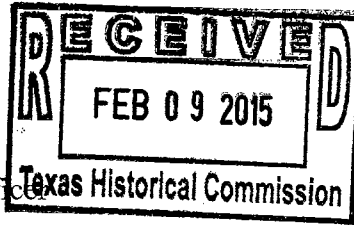
Date: 1/28/14

Applicant Signature: *Ron Phillips*



**Attachment 8**  
**Draft Cultural Resources Survey of LCRA's Proposed Fiber Optic Line**  
**Construction**

February 3, 2015



Mr. Mark Wolfe  
State Historic Preservation Office  
Texas Historical Commission  
P. O. Box 12276  
Austin, Texas 78711-2276

Re: Project Review Under Section 106 of the National Historic Preservation Act of 1966;  
Cultural Resources Survey of LCRA's Proposed Fiber Optic Line Construction at the Lane City  
Reservoir Project, Wharton County, Texas. USACE Project No. SWG-2013-00229; Texas  
Antiquities Permit No. 6777

Dear Sir:

Enclosed for your review is a copy of the Lower Colorado River Authority's (LCRA) Cultural Resources Team's draft cultural resources survey report for the proposed construction of a buried fiber optic line at LCRA's Lane City Reservoir project area. Previously, LCRA has coordinated a review of an intensive cultural resource surveys for archaeological sites and historic structures at the Lane City Reservoir Project as well as an addendum archaeological survey with your office and the U. S. Army Corps of Engineers, Galveston District. The current investigation of the fiber optic line is a further addition to archaeological survey efforts, and it is not a part of the work effort for the reservoir project's existing Memorandum of Agreement for resolution of adverse effects to the Main Canal feature and the existing Pumphouse 1 building.

During the recent cultural resource survey of the proposed fiber optic line, no archaeological sites eligible for listing on the National Register of Historic Places (NRHP) or for formal State Antiquities Landmark (SAL) designation were found. However, archaeological monitoring is recommended during the trenching for placement of the buried fiber optic cable for a 12 meter (40 foot) long area at the east end of the trench corridor to further ensure that no subsurface features related to the former 1901-era pumphouse structure at archaeological site 41WH119 are present in the project area.

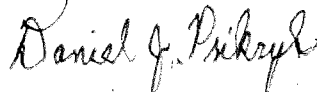
LCRA requests your concurrence with the assessments and recommendations described in the draft report. If you have any questions or would like additional information, please feel free to contact me at 512-730-6714.

Mr. Mark Wolfe


February 3, 2015

Page 2

Sincerely,



Daniel J. Prikryl, Program Manager  
LCRA Cultural Resources

CONCUR  
by   
for Mark Wolfe  
Executive Director  
Date 2-18-15  
Track#

**Project 38.14** A Cultural Resources Survey of the Lower Colorado River's Proposed Fiber Optic Line Construction at the Lane City Reservoir Project, Wharton County, Texas

DRAFT

By

Daniel J. Prikryl and Andrew F. Malof

Daniel J. Prikryl  
Principal Investigator

Texas Antiquities Permit 6777  
Lower Colorado River Authority  
Interim Report 8.14  
January 2015



## **MANAGEMENT SUMMARY**

In November 2014, the Lower Colorado River Authority's (LCRA) Cultural Resources Team conducted a cultural resource survey for the proposed installation of an approximately 140-m (460-ft) long, buried fiber optic cable line at the LCRA Lane City Reservoir project area in Wharton County, Texas (Figure 1). The proposed fiber optic cable line will be placed at the far west end of the project area, and it will extend from the existing telecom facility to Pumphouse 1 at the pump plant complex. Two mostly parallel alternate routes that are no more than 10 m (33 ft) apart were surveyed. The line will be placed in a 61 to 91 cm (2 to 3 ft) deep, 15 cm (6 in) wide trench. The cable, itself, is about 5 cm (2 in) in diameter. The cultural resource assessment was undertaken to fulfill LCRA's requirements to the Antiquities Code of Texas (ACT), the application requirements for a U. S. Army Corps of Engineers (USACE) Section 404 Permit, and Section 106 of the National Historic Preservation Act (NHPA).

Previously, the LCRA Cultural Resources Team conducted an intensive survey for the proposed reservoir project in the summer of 2013 as well as an addendum survey for additionally proposed construction elements in January 2014. Draft and final reports containing assessments and recommendations for the treatment of cultural resources have been reviewed and approved by the Texas Historical Commission (THC) and the USACE under Texas Antiquities Permit No 6540 and Section 106 of the NHPA and as a part of Preconstruction Notice (PCN) for USACE Section 404 Permitting. Mitigation of adverse effects to the Lane City Pumphouse 1 and the Main Canal is currently in progress under the terms of a Memorandum of Agreement between the USACE, THC and LCRA.

Because of the proposed fiber optic cable line is a further add-on to the reservoir construction program, a cultural resource assessment was conducted to comply with the ACT and NHPA and because the addition will require an amendment to LCRA's PCN boundaries. Since the original Texas Antiquities Permit No. 6540 requirements have been completed and the permit was closed in September 2014, the current cultural resource survey was conducted under the terms of and in accordance with LCRA's annual Texas Antiquities Permit No. 6777 for calendar year 2014. No cultural resources eligible for listing on the National Register of Historic Places (NRHP) or for State Antiquities Landmark (SAL) designation were found during the current survey of the two alternate routes. However, archaeological monitoring is recommended during the trenching at the east end of the project where the two alternate routes share the same corridor. The monitoring area extends for a length of just 12 m (40 ft) from location of ST #8 to the west end of Pumphouse #1. The monitoring will further ensure that any NRHP and SAL eligible features related to the former 1901-era pumphouse building can be recorded and assessed.

Since the survey had a "no collection" policy, there are no artifacts that will require curation.

## **NATURAL AND CULTURAL SETTING**

The natural and cultural settings of LCRA's Lane City Reservoir Project have been described in depth in the original intensive archaeological report that is on file at the THC and the USACE Galveston District offices. The reader is referred to that report for the natural and cultural backgrounds of the project area as



Figure 1. Section of the Lane City, Texas 7.5' USGS map showing the project area in red.

well as a discussion of the history of archaeological investigations that have occurred in the broader region.

## **PREVIOUS INVESTIGATIONS**

A review of project maps indicated that the eastern half of the proposed fiber optic line corridor is within the northwestern part of previously recorded site 41WH119, the Lane City Pump Plant Site (also called the LCRA Gulf Coast Plant No. 2) (Prikryl et al. 2014:72-76). This portion of the fiber optic line extends from northwest end of the Pumphouse 1 structure northwestward through the area where the 1920s-era Pumphouse 2 structure and associated canal headwall feature are located (Figure 2). Non-historic features in this area include the modern electrical substation facility and a modern storage barn. A portion of the area between the two pumphouses also lies within the footprint of the former 1901-era original pump plant building.

The subsurface deposits in the northwestern portion of 41WH119 were not investigated during the original intensive survey because at that time it did not appear that this part of the site would be affected by construction. The areas in the southeastern part of 41WH119, where construction was originally proposed, were assessed as not eligible for listing on the NRHP or for SAL designation. Later, during the addendum survey, LCRA discovered the southeast wall foundations of the original 1901-era pump plant building in the south-central part of the site. With this discovery and the aid of a remote sensing device, larger portions of the footprint of that structure were delineated. The NRHP and SAL eligibility status of this feature was not determined, but LCRA proposed to avoid impacting any foundations or buried features relating to the 1901-era pump plant building foundations by using steel pilings to shore up the proposed excavation pit that will be needed when the horizontal pump plant's intake pipes are replaced.

The file current search for the project also indicated that the western end of the fiber optic cable line route lies immediately southwest of previously recorded site 41WH120, a former twentieth century house site that was recorded during the original intensive survey (Prikryl et al. 2014:76). This site is located in a wooded area north of a dirt road that leads from the pump plant complex to the existing telecommunications tower (see Figure 2). A house is shown on the 1952 Lane City, Texas 7.5' USGS map at this location and on a 1930 aerial map. The house may also show in the background of an old photograph of the pump plant complex thought to date to the first decade of the twentieth century. The house apparently was demolished between 1952 and 1956 as it does not show on a 1956 aerial map.

An informant who was interviewed during the time of the 2013 intensive survey stated that the house at 41WH120 had been occupied by a laborer who worked on the farm located north of the LCRA pump plant property. During the field investigation in 2013, no features were evident and subsurface tests revealed very few artifacts. The site was assessed as not eligible for listing on the NRHP or for SAL designation.





Figure 2. Aerial map showing locations of archaeological sites, fiber optic trenching options, shovel tests and area recommended for archaeological monitoring.

## RESEARCH DESIGN

The additional archaeological survey investigation followed procedures and standards set forth by the NHPA and the ACT. The goals of the survey followed those of the original survey and were as follows:

1. Assess the effects of the additional ground-disturbing activities on the cultural resource sites;

2. Provide recommendations to aid in avoiding and/or minimizing impacts to cultural resource sites that may be SAL/ NRHP eligible or potentially eligible; and
3. Provide recommendations for mitigation of adverse impacts to SAL/NRHP eligible sites in cases in which avoidance is not feasible.

The research design for the original draft archaeological survey report included detailed historic contexts for prehistoric and historic sites. The reader is referred to that draft report for information on these historic contexts.

## **METHODOLOGY**

A pedestrian survey of the area encompassing the fiber optic cable routes had previously been conducted during the original intensive survey and the addendum survey. Aside from occasional brick and glass fragments in the vicinity of Pumphouses 1 and 2, no surface artifacts had been noted. As previously noted, during the addendum survey for the original investigation, the southeast foundation wall of the 1901 pump plant structure was uncovered. With the use of archival maps and a remote sensing ground-penetrating radar device, some additional parts of the footprint of the building had been plotted. That work suggests that the far eastern end of the proposed fiber optic cable corridor will pass across the south-central part of that former structure. No subsurface testing been had previously conducted, however, to search for any remaining buried remnants of other parts of outer walls/foundations or any other interior features.

In the case of the second site, 41WH120, all previous work had focused on the area on the northeast side of the dirt road where initial shovel tests and informant interview data suggested that the former house site would have been located. Since no subsurface testing had been previously conducted in parts of 41WH119 and 41WH120 pertinent to the current investigation, the current survey focused on shovel testing the route (Figures 3 and 4). Shovel tests (STs), were excavated at 15 to 30 meter intervals and in other areas where surface visibility was poor and/or in areas with a potential for buried cultural deposits. All STs were 35 to 40 cm diameter holes that were excavated in 20 cm levels with all fill being screened through ¼ inch wire mesh to determine if any artifacts were present. The STs were dug to bedrock/B horizon clay or to a depth of at least 80 to 100 cm below ground surface if bedrock/B-horizon clay was not struck. A total of nine shovel tests were excavated. The artifact recovery and soil profile resulting from each ST are found in the Appendix.

## **RESULTS**

The two fiber optic cable alternate routes were covered by pedestrian survey and shovel testing during the field survey. A total of nine shovel tests were excavated (see Figure 2). STs #1-3 were dug at the northwest end of the eastern cable line corridor in areas closest to the previously defined boundary of site 41WH120. As shown in the Appendix, these three shovel tests yielded diffuse, nondescript artifacts



Figure 3. General view of northwest end of fiber optic route area. Archaeologist is standing within proposed route.



Figure 4. Work on Shovel Test #7 in progress adjacent to 1920s-era Pump House #2 structure in southeast part of the project area.

the western route option. It yielded just one item, a modern beer can fragment which came from the upper which were all found in the upper 40 cm of deposits. ST #9 was excavated 10 m further west of ST #3 on 20 cm of deposits. Soils observed in ST #9 appeared to be very sandy fill that comes from periodic



dredging of the river channel in the vicinity of the intake pipes from the horizontal pump plant. It is probable that the topsoils of areas northwest and southeast of ST #9 consist of the same introduced fill.

Further southeastward on the eastern option route, STs #4 and 5 were dug in the vicinity of the existing electrical substation and ST #7 was excavated near the north edge of Pumphouse #2. ST #6 was excavated on the western option route just seven m (26 ft) south of ST #5. Only one rusted metal fragment was found in ST #4 and all finds at ST #5 consist of oyster shell fragments that are related to an old road paving episode within the upper 20 cm of soil deposits. More numerous and diverse cultural materials were found in Shovel Tests #6 and 7. The artifacts were spread through 100 cm of deposits at ST #6 and 60 cm of deposits at ST #7 (Figure 5). The cultural materials from these two shovel tests consist of four clear glass fragments, two wire nails, seven brick fragments, eight concrete chunks, three deteriorated metal fragments, and one whiteware ceramic rim sherd. These materials may be associated with 4JWH119. However, all of the historic artifacts from these two shovel tests come from heavily disturbed soils, thus making interpretations difficult.

ST #8 was excavated near the southeast end of the project area between the two pumphouses. It is located in the vicinity of the western edge of the former pumphouse building constructed in 1901. Numerous oyster shell fragments and limestone gravels related to previous road paving episodes were found along with many small, nondescript chunks of concrete. Soil deposits consisted of mottled, multi-colored clay chunks that are evidence of heavy disturbance. No clear evidence the wall, foundation or interior of the pumphouse was seen. This shovel test was terminated at 70 cm.



Figure 5. Artifacts recovered in Shovel Test #6 shown in vertical columns by level (L1) through L5). Level 1: two flat clear glass fragments; Level 2: one small shell, three Asian clams, 1 clear glass fragment, one whiteware ceramic rim fragment; Level 3: one Asian clam, one clear bottle glass fragment, three rusted metal fragments; Level 4: one large brick fragment, one mussel shell fragment; Level 5: one small brick fragment, two concrete chunks.

## **SUMMARY AND RECOMMENDATIONS**

The LCRA Cultural Resources conducted a cultural resource survey for the installation of a buried fiber optic line at LCRA's Lane City Reservoir Project in November 2014. Two options for the proposed corridor for the buried line were examined and each extends from the northwestern end of previously recorded site 41WH119 through the area southwest of previously recorded site 41WH120. Pedestrian survey and shovel testing along the fiber line alternate routes produced no evidences of any archaeological remains that are NR or SAL eligible. Archaeological monitoring is recommended at the east end of the project where the two route options share a common corridor that will pass through the footprint of the former 1901-era pumphouse structure. Specifically, the monitoring area extends for a length of approximately 12 m (40 ft) from the location of ST #8 to the west end of Pumphouse #1. The purpose of the monitoring will be to record and assess the NR and SAL eligibility status any features and artifacts related to the 1901-era pumphouse building that may be exposed during the excavation of the trench for the buried cable line. The results of the monitoring will be submitted to the USACE and the THC as a letter report.

## REFERENCES

Prikryl, D. J., A. F. Malof, C. A. Hixson and E. A. Schroeder

2014 *An Intensive Cultural Resource Survey of LCRA's Proposed Lower Basin Reservoir Project at Lane City, Wharton County, Texas*. Report of Investigations No. 19. Lower Colorado River Authority, Austin.

**Appendix: Recovery and shovel test soil profiles.**

Shovel Test	Level 1 Recovery	Level 2 Recovery	Level 3 Recovery	Level 4 Recovery	Level 5 Recovery	Soil Profile
1	1 small twisted metal pull tab	1 small bone frag.	No Recovery (NR)	NR	NR	0-33 cm: 7.5YR4/3 brown clay loam; 33-43 cm: 7.5YR 5/3 brown sandy clay loam; 43-100 cm: 7.5 YR6/3 light brown sandy silt
2	2 small oyster shell frags.	NR	NR	NR	NR	0-18 cm: 7.5 YR 4/2 brown clay loam; 18-43 cm: 7.5 YR 6/3 light brown sandy silt; 83-89 cm: 7.5 YR 4/2 brown clay loam 89-100 cm: 7.5 YR 6/3 light brown sandy silt
3	1 piece of concrete (8x5x2 cm), 4 small oyster shell frags, 1 piece of limestone road gravel	1 medium-sized oyster shell frag. (5 cm in length)	NR	NR	Not Applicable (NA)	0-17 cm: 7.5 YR 3/2 dark brown clay loam; 17- 36 cm: 7.5 YR 4/3 brown clay loam; 36-47 cm: 7.5 YR 5/3 brown clay loam; 47-55 cm: 7.5 YR 6/3 light brown clay; 55-63 cm: 7.5 YR 5/3 brown clay loam; 63-75 cm: 7.5 YR 6/3 light brown clay

Shovel Test	Level 1 Recovery	Level 2 Recovery	Level 3 Recovery	Level 4 Recovery	Level 5 Recovery	Soil Profile
4	1 small plastic tape frag. (3x2 cm), 1 small oyster shell frag.	1 flat rusted metal frag. (1x1 cm); 1 oyster shell frag., 1 small burned clay lump	NR	NR	NR	0-7 cm: 7.5 YR 3/2 organic zone- 7.5 YR 3/2 dark brown clay loam; 7-28 cm: 7.5YR4/3 brown clay loam; 28-35 cm: 7.5YR4/2 brown clay loam; 35-47 cm: 7.5YR5/3 brown clay loam; 47-64 cm: 7.5YR6/3 light brown sandy loam; 65-100 cm: 7.5YR4/3; brown clay loam
5	1 oyster shell frag. (4x3x1 cm), 16 very small oyster shell frags. (generally 1x1x0.03 cm)	1 oyster shell frag. (3x2x1 cm)	NR	NA	NA	0-14 cm: 7.5YR3/2 dark brown loam; 14-16 cm: 7.5YR3/2 dark brown loam with lens of oyster shell frags from old road bed; 16-20 cm: 7.5YR3/1 very dark gray clay; 20-23 cm: 7.5YR4/3 brown clay; 23-33 cm: 7.5YR3/2 dark brown sandy loam; 33-39 cm: 7.5YR4/3 brown clay; 39-44 cm: 7.5YR3/1 dark gray sandy loam

Shovel Test	Level 1 Recovery	Level 2 Recovery	Level 3 Recovery	Level 4 Recovery	Level 5 Recovery	Soil Profile
5 cont.						44-50 cm: 7.5YR6/3 light brown sand
6	2 clear flat glass frags. and several oyster shell frags.	1 whiteware ceramic rim sherd, 1 clear glass bottle frag., 3 Asian clams, 1 snail shell	3 metal flat sheet frags, 1 clear glass bottle frag, 1 Asian clam	1 large pale yellow brick frag, 1 concrete chunk, 1 mussel shell frag.	1 small brick frag, 2 concrete chunks, numerous Asian clams	0-13 cm: 7.5YR4/2 disturbed brown sandy loam with small pebbles and coarse sand throughout; 13-37 cm: 7.5YR4/4: disturbed brown sandy loam with small pebbles and coarse sand throughout; 37-100 cm: 7.5YR4/4, 7.5YR5/6 and 7.5YR6/4 disturbed mix of brown and light brown coarse grained sand and gray clay
7	dense oyster shell fragments used as road base	3 yellow brick frags, 2 concrete frags, 1 sixteen penny wire nail	1 sixteen penny wire nail, 2 yellow brick frags, 3 small concrete chunks, 4 oyster shell frags, several crumbling unidentifiable rusted metal frags.	NA	NA	0-10 cm: 7.5YR4/2 dark brown clay loam; 10-16 cm: dense oyster shell within 7.5YR4/2 dark brown clay loam; 16-26 cm: 7.5YR4/2 dark brown clay loam; 26-31 cm: 7.5YR6/4 light brown sandy loam; 31-60 cm: 7.5YR4/3 disturbed mix of brown clay loam, gray clay, light brown sandy loam mottles, and charcoal streaks



Shovel Test	Level 1 Recovery	Level 2 Recovery	Level 3 Recovery	Level 4 Recovery	Level 5 Recovery	Soil Profile
8	dense oyster shells, gravel, and concrete chunks	dense oyster shells and concrete chunks from 20-29 cm	NR	NR	NA	0-29 cm: road bed materials – oyster shells, gravels, concrete chunks in 7.5 YR5/3 mixed brown sandy loam and clay loam matrix 29-70 cm: disturbed mottled 7.5YR4/4 brown to dark grayish brown clay loam and clay
9	1 Miller Lite beer can frag, 1 Asian clam	NR	NR	NR	NR	0-23 cm: 7.5YR5/4 brown sandy loam with pebbles and coarse sand pockets - dredge material; 23-90 cm: 7.5YR6/4 light brown sandy silt dredge material

## **Worksheet 5**

### **Attachment 3:**

**USACE Galveston - LCRA Permit Verification (2018)**



DEPARTMENT OF THE ARMY  
GALVESTON DISTRICT, CORPS OF ENGINEERS  
P. O. BOX 1229  
GALVESTON, TEXAS 77553-1229

March 28, 2018

REPLY TO  
ATTENTION OF:

Policy Analysis Branch

SUBJECT: Permit No. SWG-2013-00229; Nationwide Permit Verification

Ed Penstock, P.E.  
Director, Strategic Projects  
Lower Colorado River Authority  
Box 220, Mail Code H107  
Austin, Texas 78767

Dear Mr. Penstock:

This is in reference to your request, dated January 30, 2018, to complete construction of the Arbuckle Reservoir (formerly Lane City reservoir). The project site is located along the Colorado River and Jarvis Creek, approximately 8,000 feet southwest of the State Highway 60 and Farm-to-Market Road 442 (Lenert Street) intersection, near Lane City, in Wharton County, Texas.

This request is verified by Nationwide Permit (NWP) 3, NWP 12, NWP 13, NWP 14, NWP 18, and NWP 31 pursuant to Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899. This NWP verification is valid provided the activity is compliant with the enclosed plans, in 21 sheets. In addition, the activity must be in compliance with the NWP General/Regional Conditions, Section 401 Water Quality Certification, and the Coastal Management Program, which can be found at: <http://www.swg.usace.army.mil/Business-With-Us/Regulatory/Permits/Nationwide-General-Permits/>. A hard copy can be provided to you upon request.

Nationwide Permit 3. Maintenance: Authorizes the repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure or fill, or of any currently serviceable structure or fill authorized.

Nationwide Permit 12. Utility Line Activities: Authorizes activities required for the construction, maintenance, repair, and removal of utility lines and associated facilities in waters of the United States.

Nationwide Permit 13. Bank Stabilization: Authorizes activities necessary for erosion control or prevention, such as vegetative stabilization, bioengineering, sills, rip rap, revetment, gabion baskets, stream barbs, and bulkheads, or combinations of other methods.

Nationwide Permit 14. Linear Transportation Projects: Authorizes activities required for crossings of waters of the United States associated with the construction, expansion, modification, or improvement of linear transportation projects.

Nationwide Permit 18. Minor Discharges: Authorizes minor discharges of dredged or fill material into all waters of the United States.

Nationwide Permit 31. Maintenance of Existing Flood Control Facilities: Authorizes the discharges of dredged or fill material resulting from activities associated with the maintenance of existing flood control facilities.

We have determined the proposed activity would comply with all the terms and conditions of NWP 13 and that the adverse environmental effects of the proposed project would be minimal both individually and cumulatively. Therefore, in this case, we are waiving the 500-linear feet threshold specified in NWP 13.

This NWP verification is valid until the NWP is modified, reissued, or revoked. All of the existing NWPs are scheduled to be modified, reissued, or revoked prior to March 18, 2022. It is incumbent upon you to remain informed of changes to the NWPs. We will issue a public notice when the NWPs are reissued. Furthermore, if you commence or are under contract to commence this activity before the date that the relevant NWP is modified or revoked, you will have 12 months from the date of the modification or revocation of the NWP to complete the activity under the present terms and conditions of this NWP.

The following special conditions have been added to your authorization:

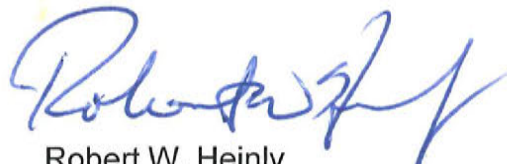
1. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.



2. When structures or work authorized by this permit are determined by the District Engineer to have become abandoned, obstructive to navigation or cease to be used for the purpose for which they were permitted, such structures or other work must be removed, the area cleared of all obstructions, and written notice given to the Chief of Compliance, Galveston/Corpus Christi Office District Regulatory Branch, within 30 days of completion.
3. Prior to construction or the commencement of work within the boundary of the Main Canal or Pumphouse #1, the permittee shall sign and adhere to the terms and conditions of the Memorandum of Agreement between the U.S. Army Corps of Engineers, Galveston District, the Lower Colorado River Authority, and the Texas State Historic Preservation Officer, Regarding the Resolution of Adverse Effects to the Main Canal and Pumphouse 1, Wharton County, Texas.

If you have any questions regarding this verification, please contact Mr. Jayson M. Hudson at the letterhead address or by telephone at 409-766-3108. Please notify the Chief of the Compliance Branch in the Galveston District Regulatory Division, in writing, at the letterhead address, upon completion of the authorized project.

FOR THE DISTRICT COMMANDER:



Robert W. Heinly  
Chief, Policy Analysis Branch

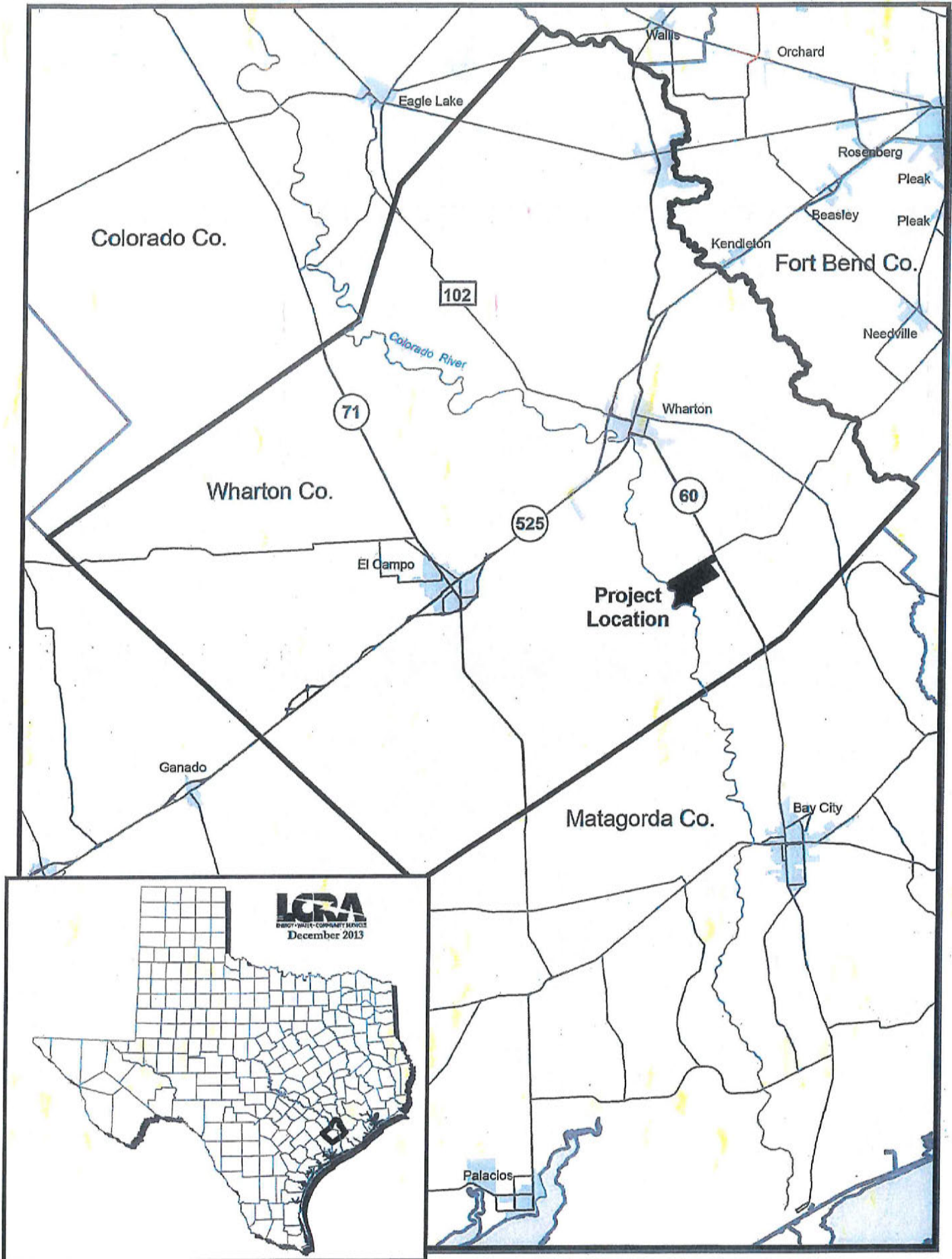
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Eighth Coast Guard District, New Orleans, LA

National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), Coast & Geodetic Survey, Silver Spring, MD

Texas Commission on Environmental Quality

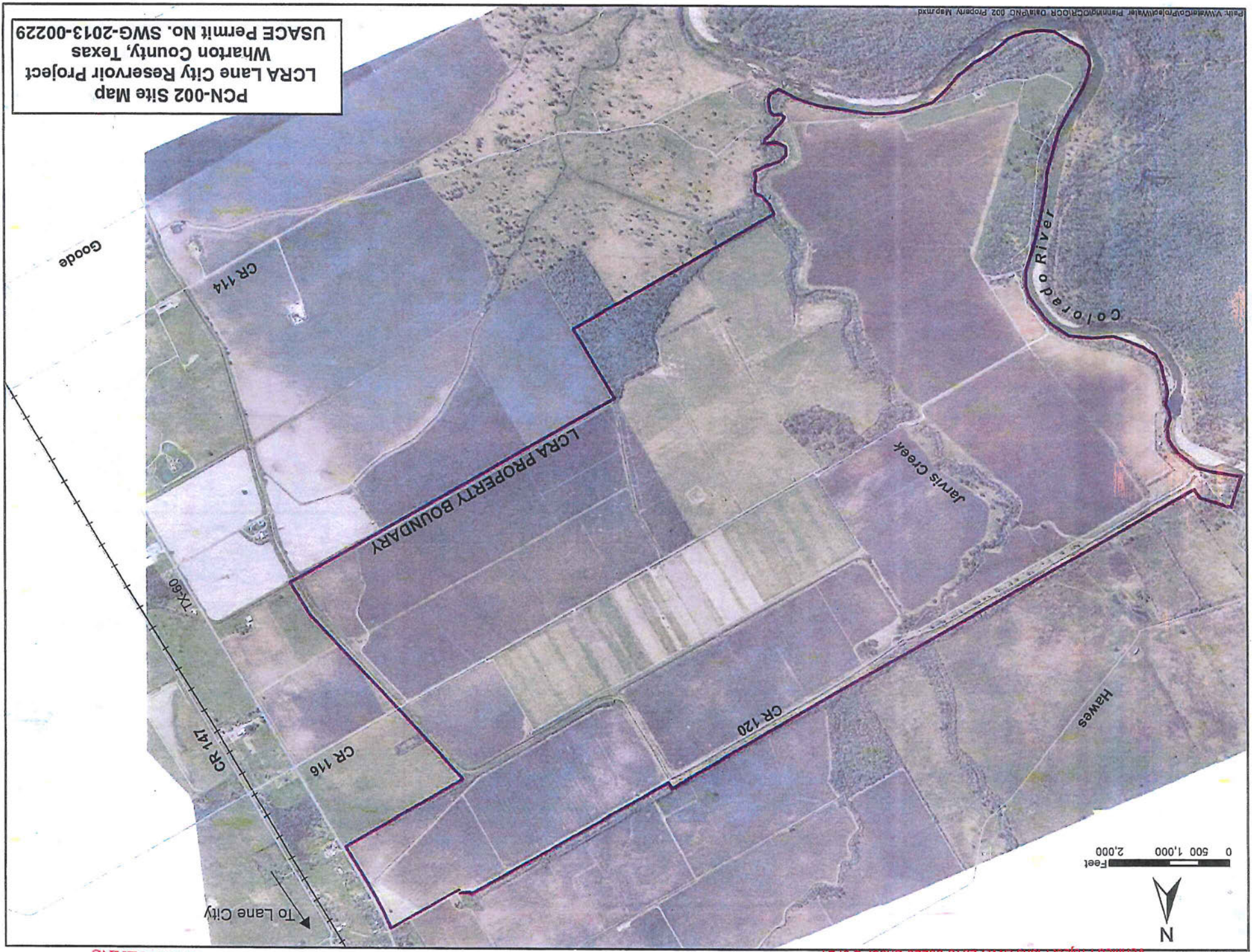
Texas General Land Office



PCN-001 Project Location  
LCRA Lane City Reservoir Project Wharton County, Texas  
USACE Permit No. SWG-2013-00229



PCN-002 Site Map  
LCRA Lane City Reservoir Project  
Wharton County, Texas  
USACE Permit No. SWG-2013-00229



PERMITTED PLANS

Verified Project Plans SWG-2013-00229 Sheet 2 of 21

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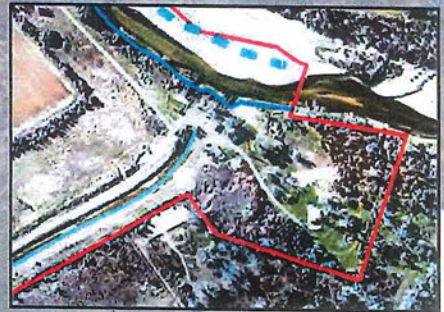
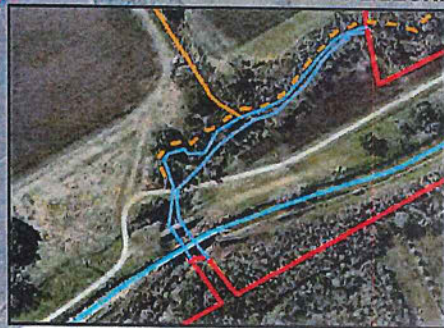
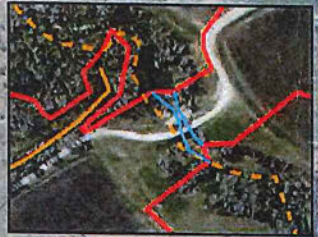
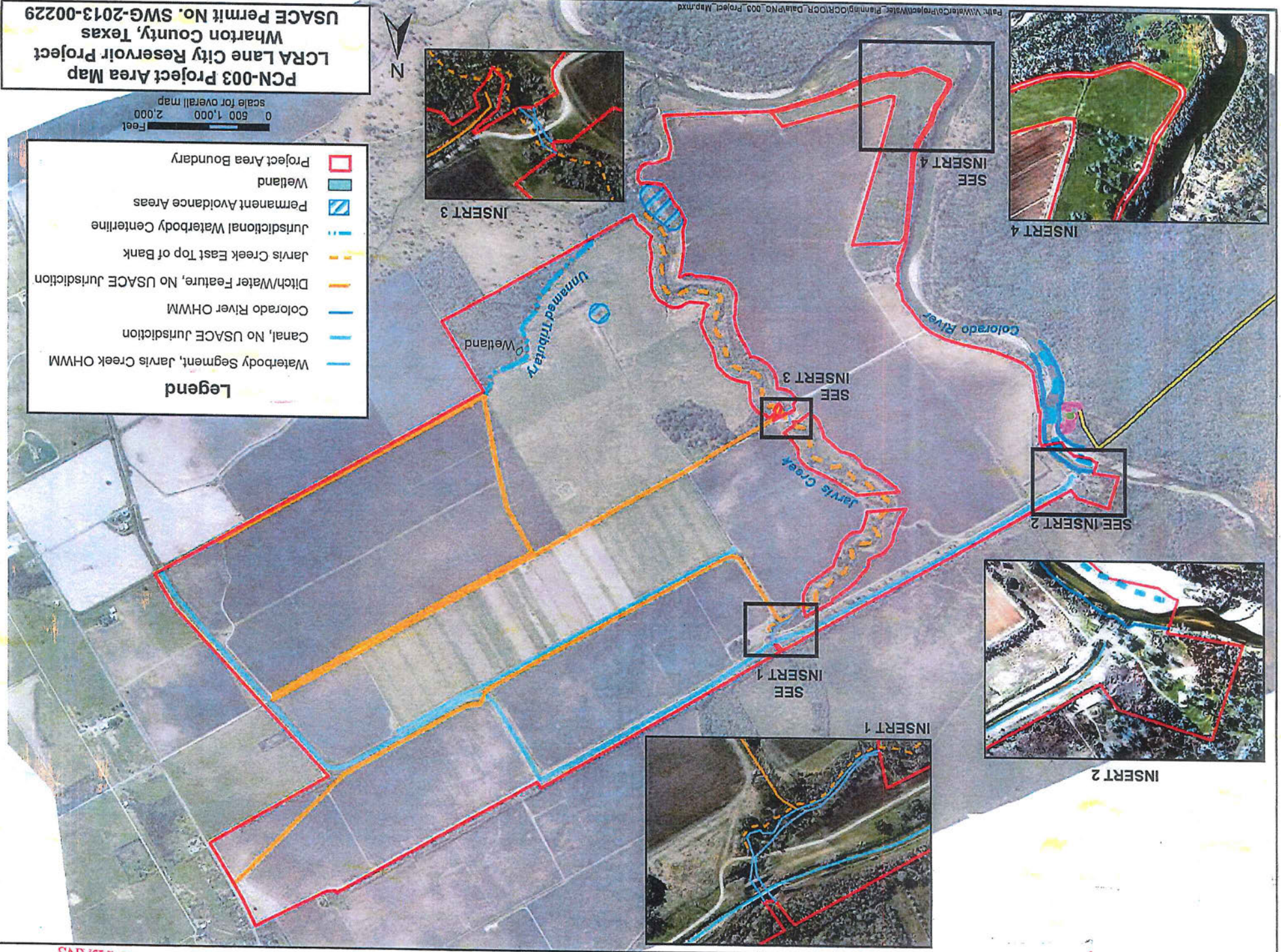


**PCN-003 Project Area Map**  
**LCRA Lane City Reservoir Project**  
**Wharton County, Texas**  
**USACE Permit No. SWG-2013-00229**

0 500 1,000 2,000  
 Feet  
 scale for overall map



- Legend**
- Waterbody Segment, Jarvis Creek OHWM (Blue line)
  - Canal, No USACE Jurisdiction (Light blue line)
  - Colorado River OHWM (Dark blue line)
  - Ditch/Water Feature, No USACE Jurisdiction (Orange line)
  - Jarvis Creek East Top of Bank (Yellow dashed line)
  - Jurisdictional Waterbody Centerline (Blue dashed line)
  - Permanent Avoidance Areas (Blue hatched area)
  - Wetland (Light blue area)
  - Project Area Boundary (Red outline)

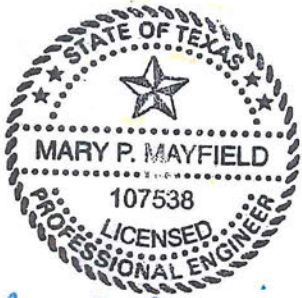


PERMITTED PLANS

Verified Project Plans SWG 2013-00229 Sheet 3 of 21

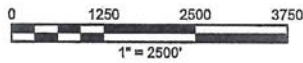
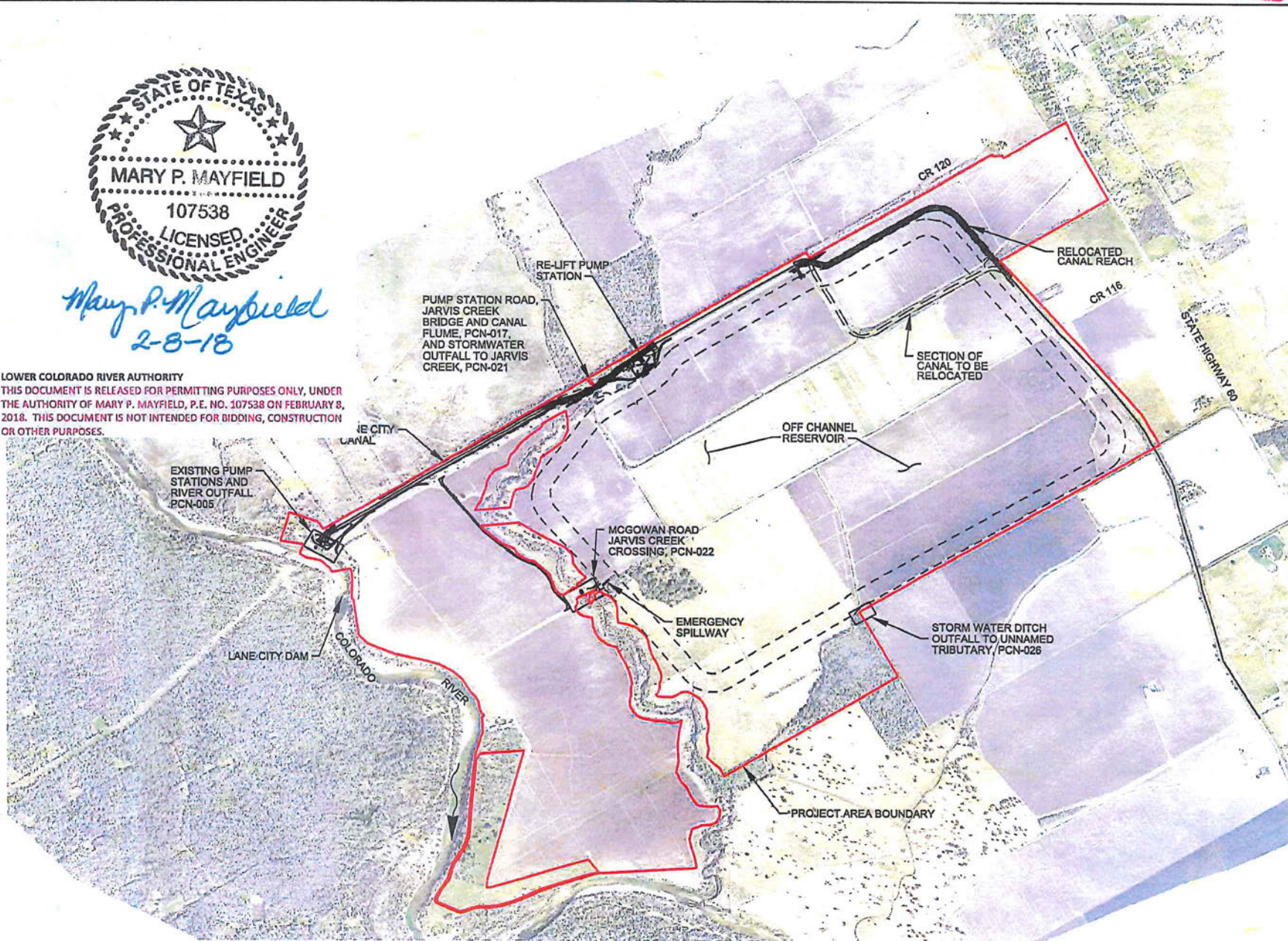
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GENERAL  
 OVERALL SITE  
 AND ACCESS PLAN

PCN-004

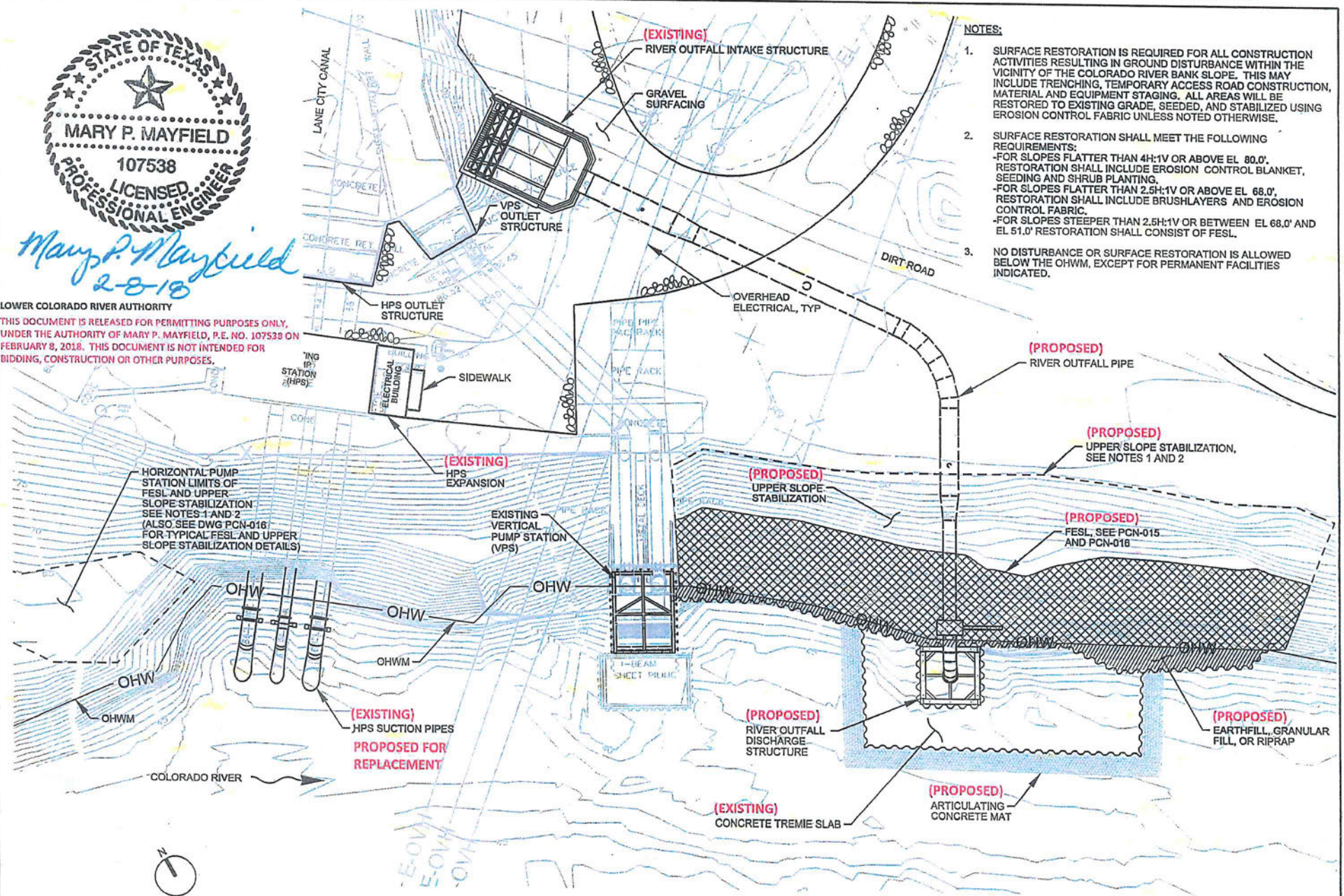






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- NOTES:**
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  - SURFACE RESTORATION SHALL MEET THE FOLLOWING REQUIREMENTS:  
 -FOR SLOPES FLATTER THAN 4H:1V OR ABOVE EL. 80.0', RESTORATION SHALL INCLUDE EROSION CONTROL BLANKET, SEEDING AND SHRUB PLANTING.  
 -FOR SLOPES FLATTER THAN 2.5H:1V OR ABOVE EL. 68.0', RESTORATION SHALL INCLUDE BRUSHLAYERS AND EROSION CONTROL FABRIC.  
 -FOR SLOPES STEEPER THAN 2.5H:1V OR BETWEEN EL. 68.0' AND EL. 51.0' RESTORATION SHALL CONSIST OF FESL.
  - NO DISTURBANCE OR SURFACE RESTORATION IS ALLOWED BELOW THE OHWM, EXCEPT FOR PERMANENT FACILITIES INDICATED.

HORIZONTAL PUMP STATION LIMITS OF FESL AND UPPER SLOPE STABILIZATION SEE NOTES 1 AND 2 (ALSO SEE DWG PCN-016 FOR TYPICAL FESL AND UPPER SLOPE STABILIZATION DETAILS)



**SITE PLAN**  
1"=50'

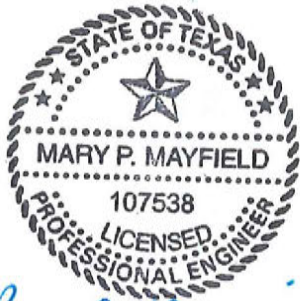
**GENERAL SITE PLAN - RIVER INTAKE AND OUTFALL**

REVISED FEBRUARY 8, 2018

PCN-005

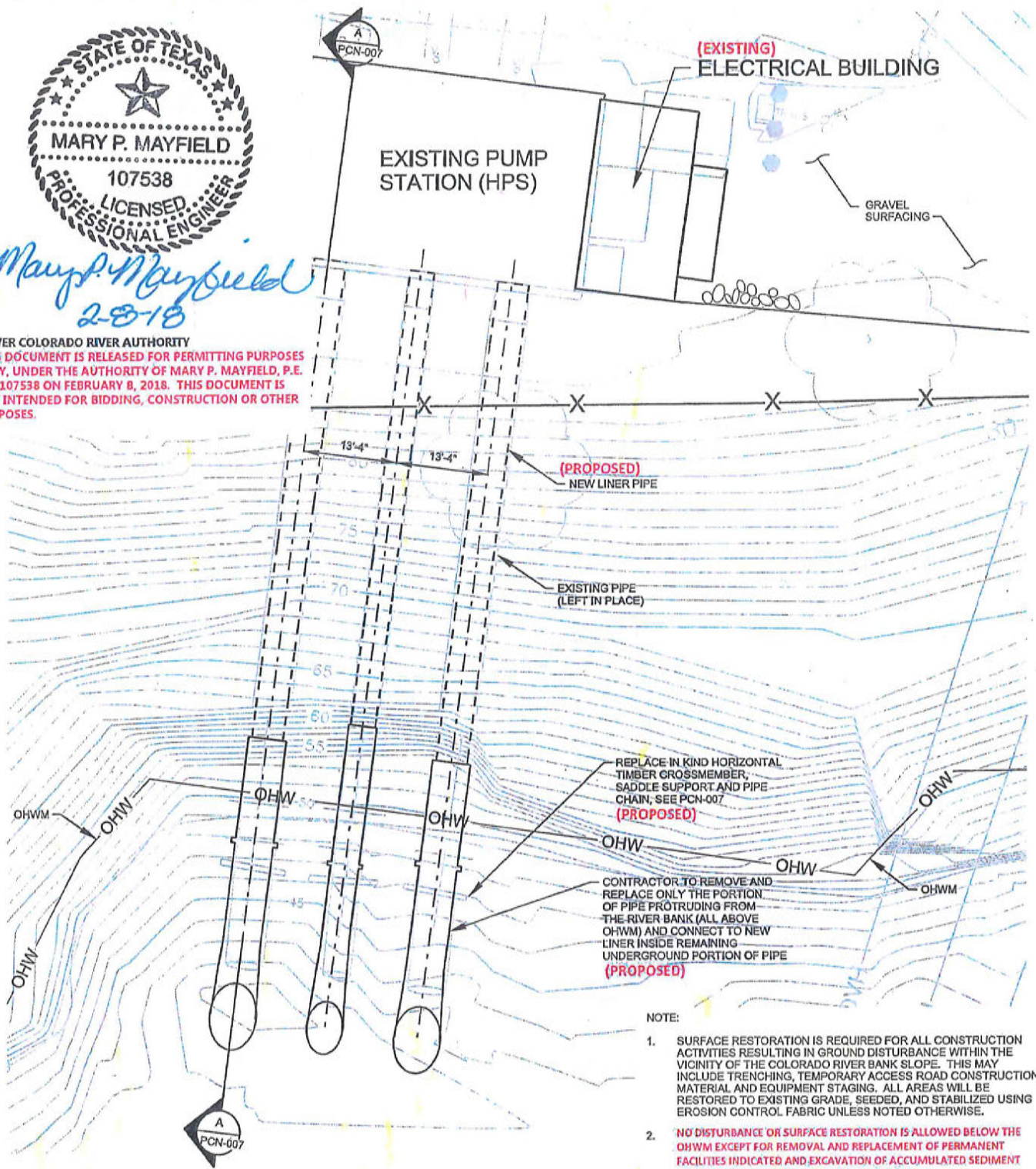




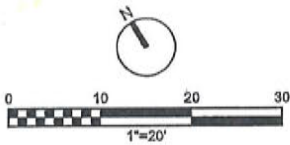


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**SUCTION PIPING PLAN VIEW**  
1"=20'



**HORIZONTAL PUMP STATION  
REPLACEMENT OF SUCTION PIPING  
PLAN**

REVISED FEBRUARY 8, 2018

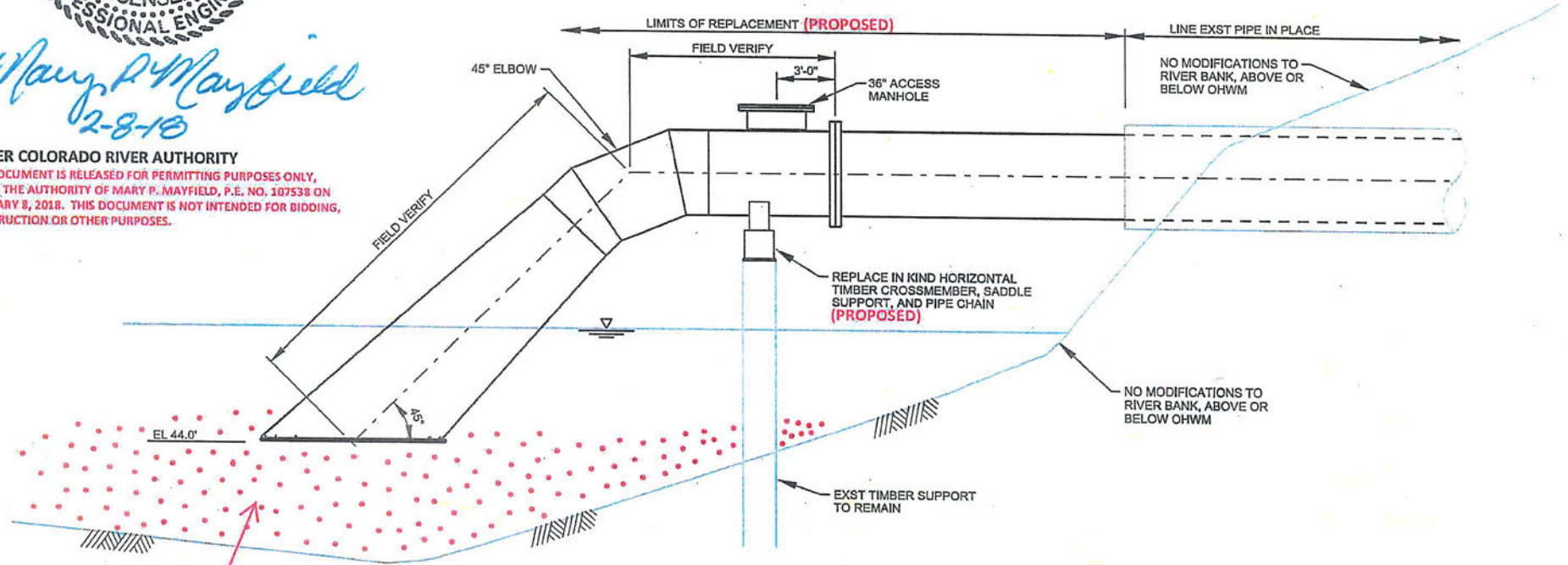
PCN-006





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EXCAVATE ACCUMULATED SEDIMENT  
ONLY TO EXTENT NECESSARY TO REMOVE  
AND REPLACE SUCTION BELLS.

**A** SECTION  
NTS  
PCN-006

NOTE:  
1. ALL EXCAVATED SEDIMENT WILL  
BE PLACED IN A DESIGNATED,  
UPLAND AREA.

**HORIZONTAL PUMP STATION  
REPLACEMENT OF SUCTION PIPING SECTION**

REVISED FEBRUARY 8, 2018

PCN-007





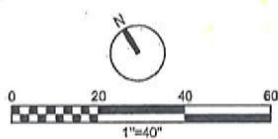
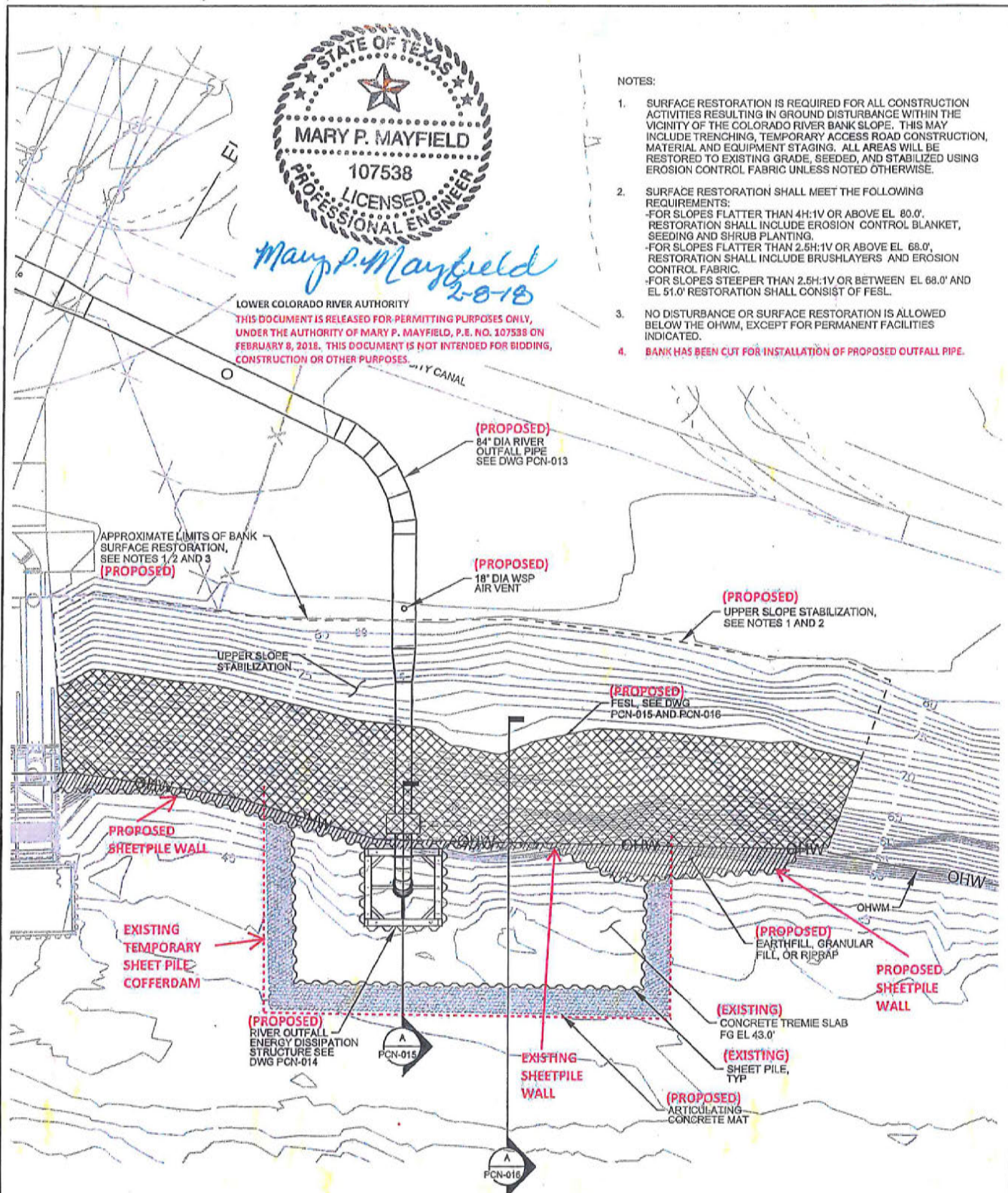


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-FOR SLOPES STEEPER THAN 2.5H:1V OR BETWEEN EL. 68.0' AND EL. 51.0' RESTORATION SHALL CONSIST OF FESL.
3. NO DISTURBANCE OR SURFACE RESTORATION IS ALLOWED BELOW THE OHWM, EXCEPT FOR PERMANENT FACILITIES INDICATED.
4. BANK HAS BEEN CUT FOR INSTALLATION OF PROPOSED OUTFALL PIPE.

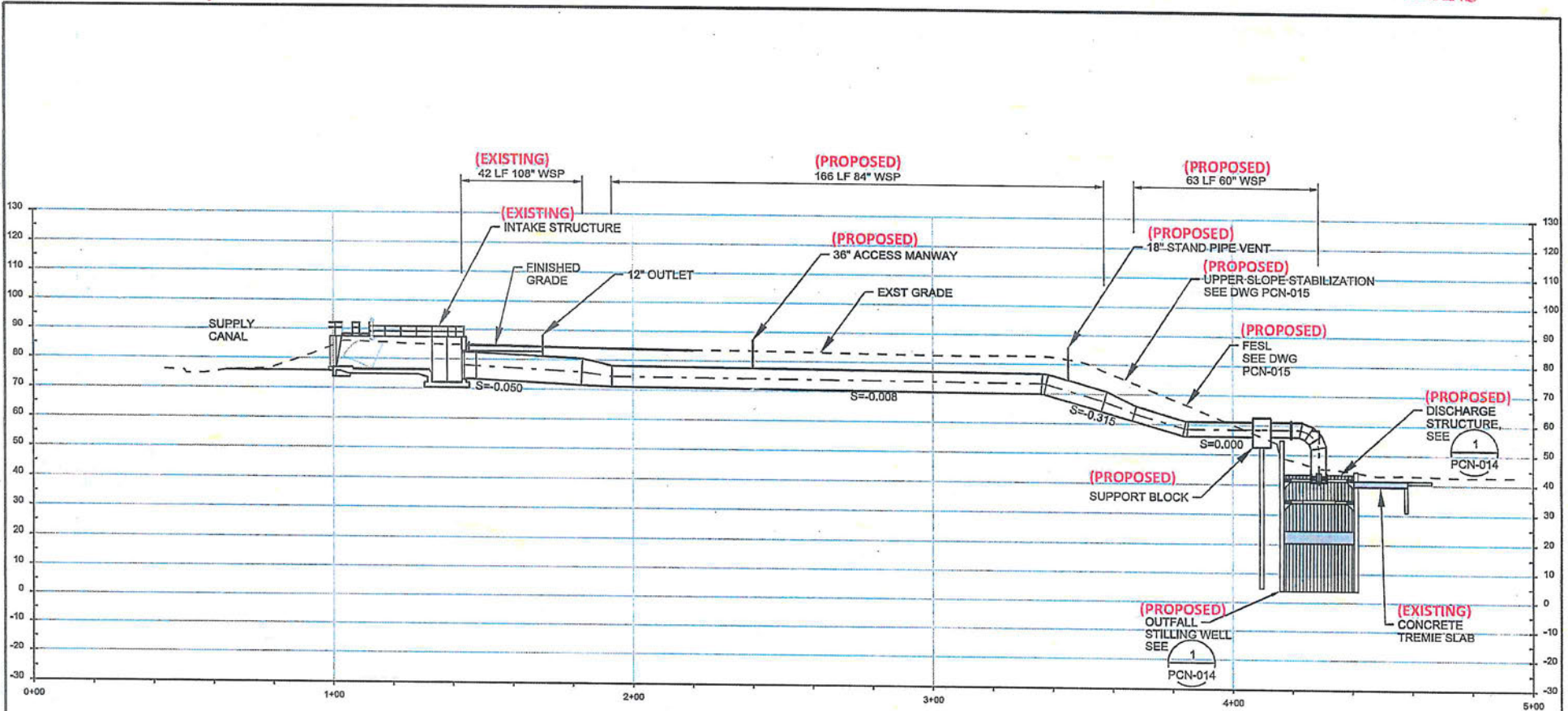


RIVER OUTFALL  
SITE PLAN

REVISED FEBRUARY 8, 2018

PCN-012





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 2-8-18

**RIVER OUTFALL PIPE PROFILE**  
 HORIZ: 1"=50'  
 VERT: 1"=25'

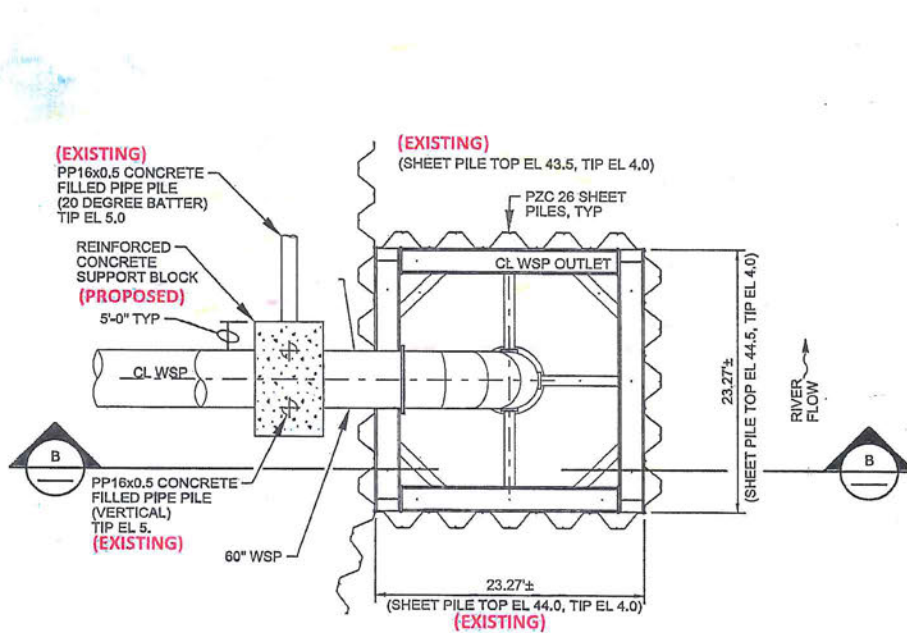
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RIVER OUTFALL PIPELINE PROFILE

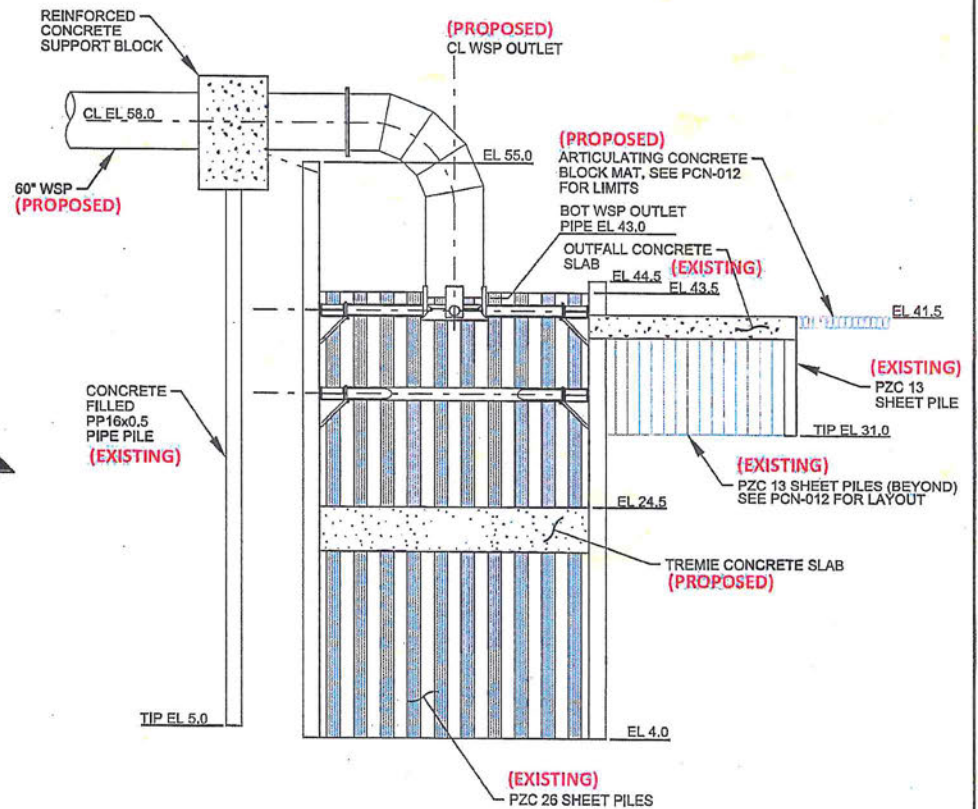
REVISED FEBRUARY 8, 2018  
 PCN-013



**NOTE:**  
 1: EXCAVATION TO FINAL GRADE, TREMIE CONCRETE SLAB, AND STRUCTURAL COMPONENTS WITHIN OUTFALL STILLING WELL ARE PROPOSED.



**A** STILLING WELL PLAN  
 1/8" = 1'-0"  
 PCN-013



**B** SECTION  
 1/8" = 1'-0"



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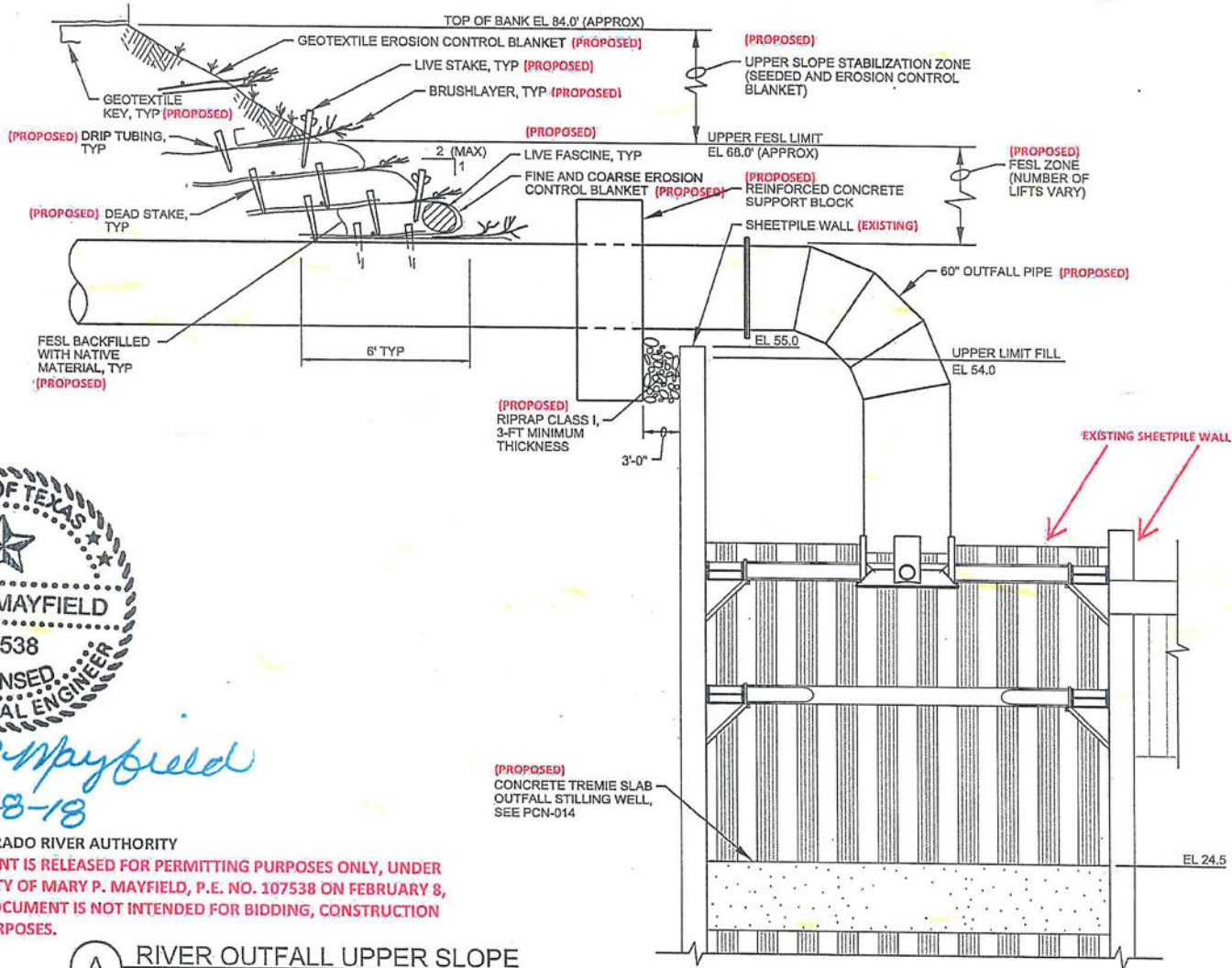
RIVER OUTFALL  
 DISCHARGE STRUCTURE PLANS  
 AND SECTION

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PCN-014







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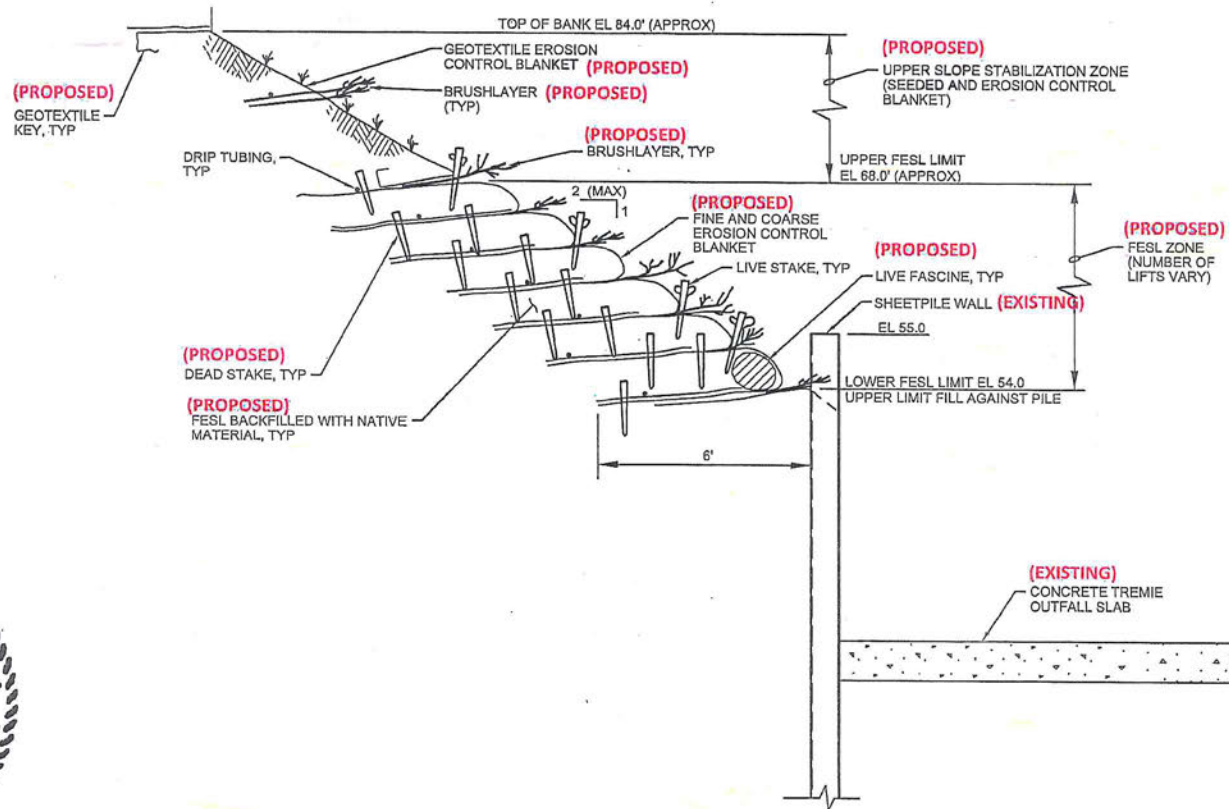
(A) RIVER OUTFALL UPPER SLOPE STABILIZATION AND FESL TYPICAL SECTION  
PCN-012  
NTS

RIVER OUTFALL UPPER SLOPE STABILIZATION AND FESL DETAIL

REVISED FEBRUARY 8, 2018

PCN-015

**CH2MHILL**



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2-8-18

**(A) RIVER OUTFALL UPPER SLOPE STABILIZATION AND FESL TYPICAL SECTION**  
PCN-012  
NTS

RIVER OUTFALL TREMIE SLAB AND SHEETPILE SECTION

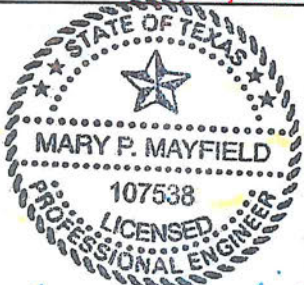
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PCN-016

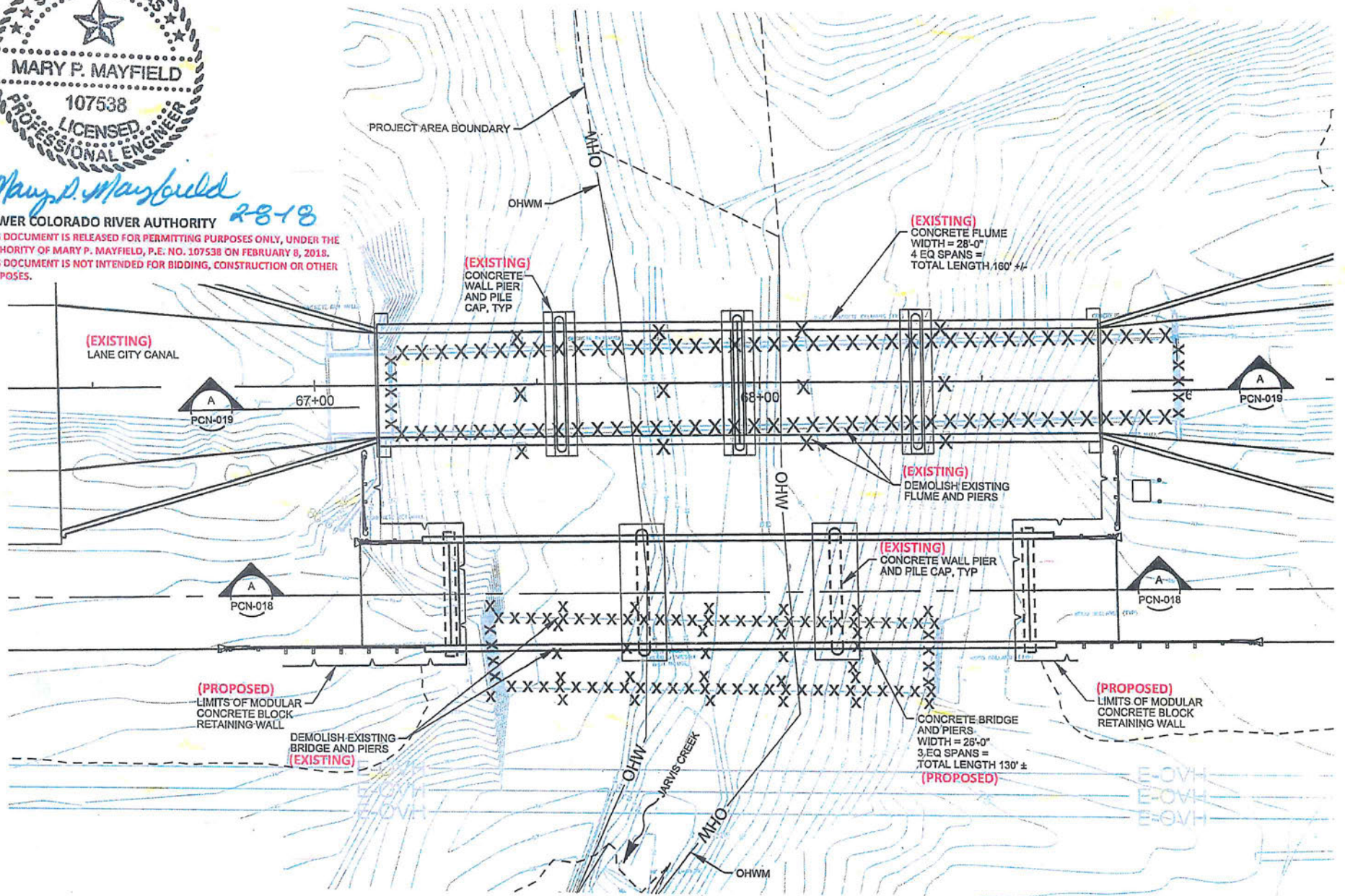






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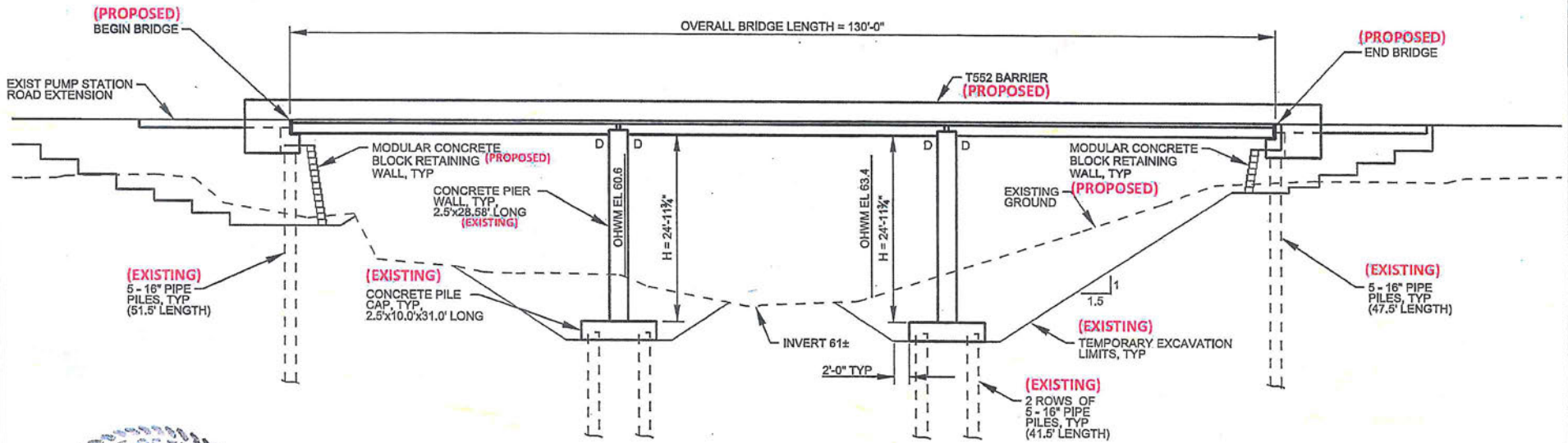
PUMP STATION ROAD  
JARVIS CREEK BRIDGE  
AND CANAL FLUME PLAN

REVISED FEBRUARY 8, 2018

PCN-017







*Mary P. Mayfield*  
2-8-18

**A SECTION**  
1"=20"

**NOTES:**  
CONSTRUCTION OF PIPE PILES, PILE CAPS AND PIER WALLS IS COMPLETE. EXTENT OF TEMPORARY EXCAVATIONS WITHIN THE CREEK BED WAS LIMITED USING TEMPORARY SHEET PILES. BACKFILLING OF THE TEMPORARY EXCAVATIONS AND RESTORATION OF THE DISTURBED CREEK CHANNEL ARE PROPOSED.

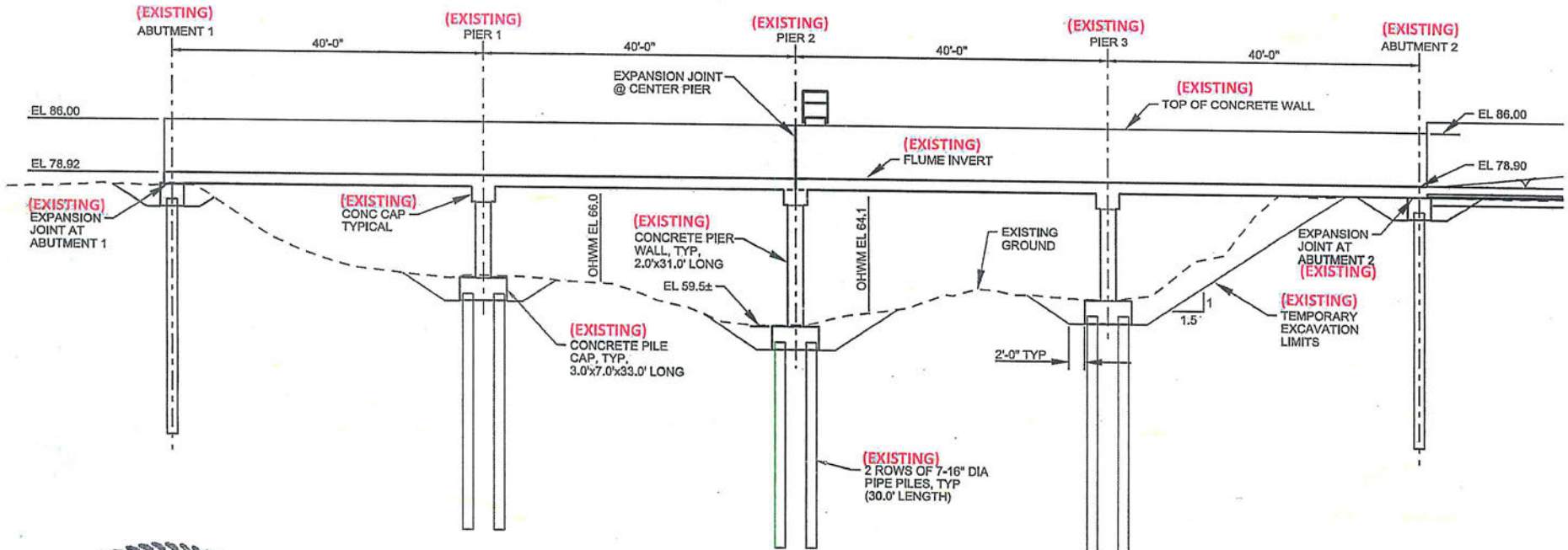
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PUMP STATION ROAD  
JARVIS CREEK  
BRIDGE SECTION

REVISED FEBRUARY 8, 2018

PCN-018





**A SECTION**  
1"=20'-0"

**NOTES:**  
 CONSTRUCTION OF PIPE PILES, PILE CAPS, PIER WALLS AND FLUME IS COMPLETE. BACKFILLING OF TEMPORARY EXCAVATIONS AND RESTORATION OF THE DISTURBED CREEK CHANNEL IS PROPOSED.



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LANE CITY CANAL  
 FLUME SECTION

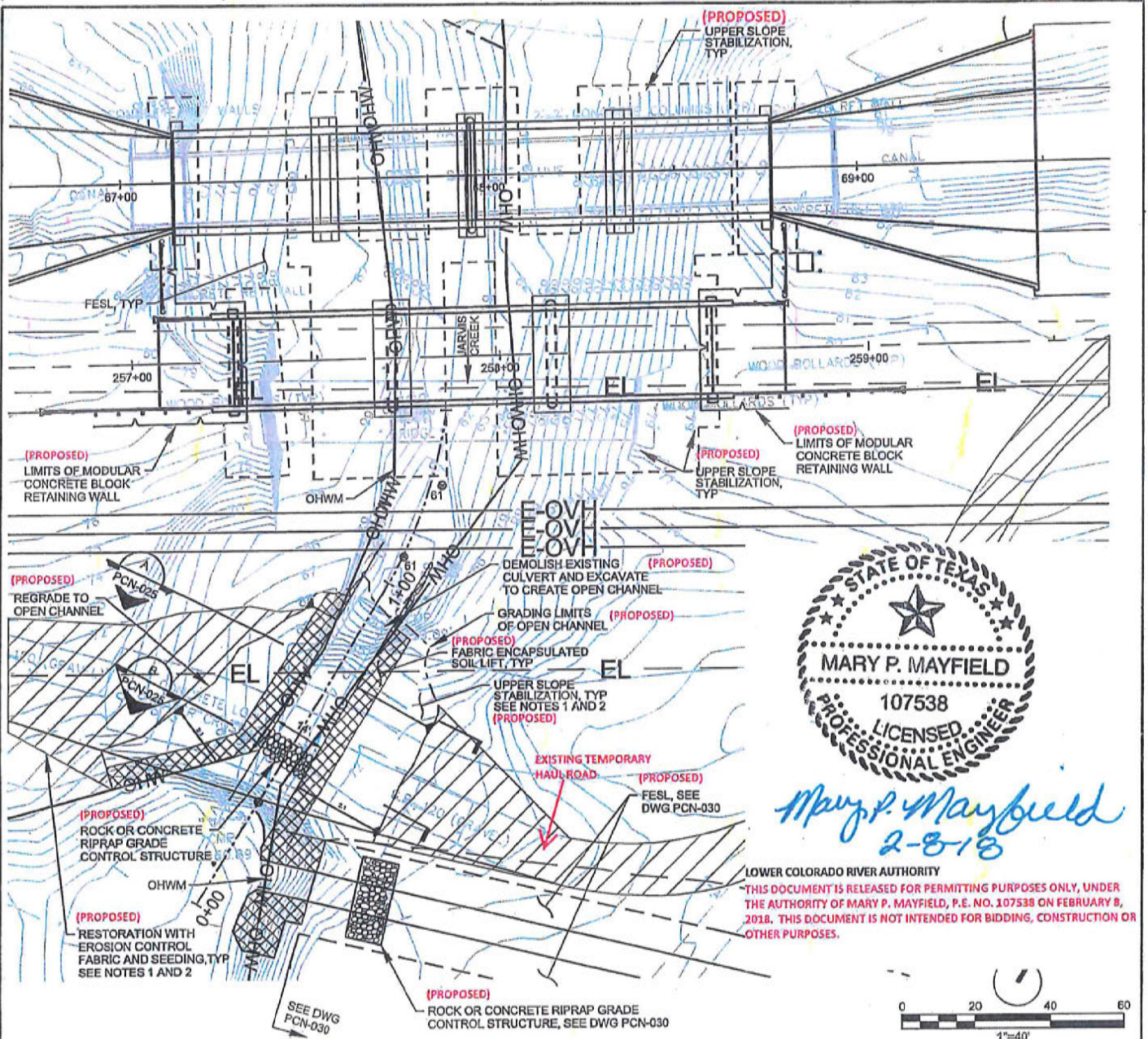
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PCN-019



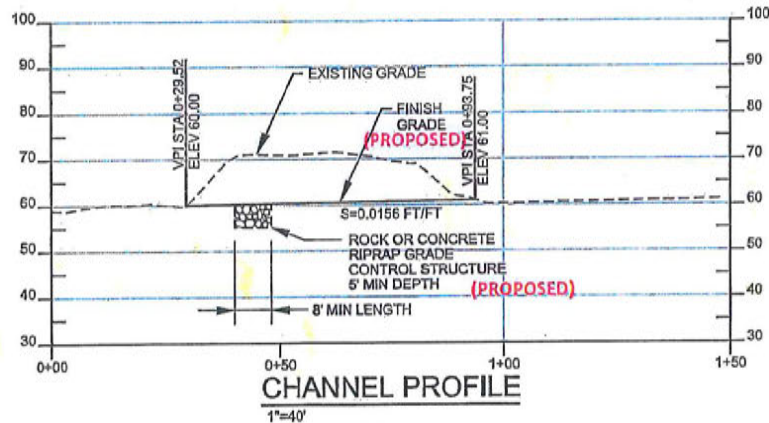


PERMITTED PLANS



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-FOR SLOPES BETWEEN 4H:1V AND 2.5:1V, RESTORATION SHALL INCLUDE BRUSHLAYERS AND EROSION CONTROL FABRIC.  
-FOR SLOPES STEEPER THAN 2.5H:1V OR BELOW AN ELEVATION CORRESPONDING TO 6 FT ABOVE CHANNEL INVERT, RESTORATION SHALL CONSIST OF FESL.
3. NO DISTURBANCE OR SURFACE RESTORATION IS ALLOWED BELOW THE OHWM, EXCEPT FOR PERMANENT FACILITIES INDICATED.

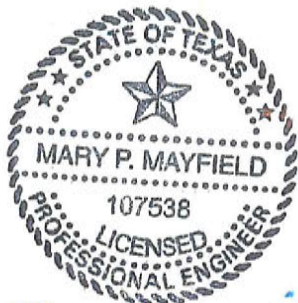
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LANE CITY CANAL FLUME AND PUMP STATION ROAD  
JARVIS CREEK CROSSING AND STORMWATER OUTFALL  
TO JARVIS CREEK RESTORATION SITE PLAN

PCN-021

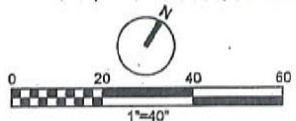
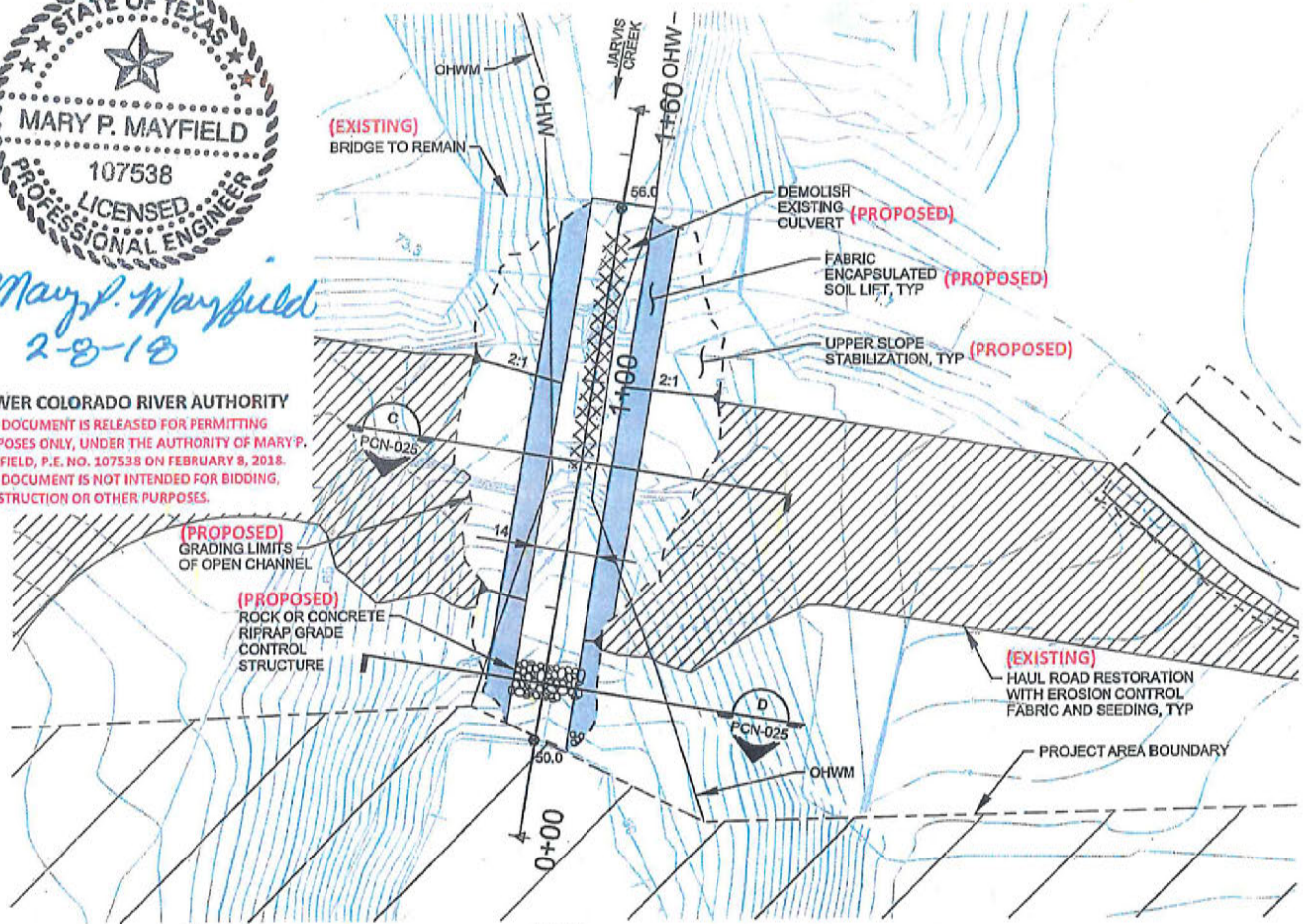






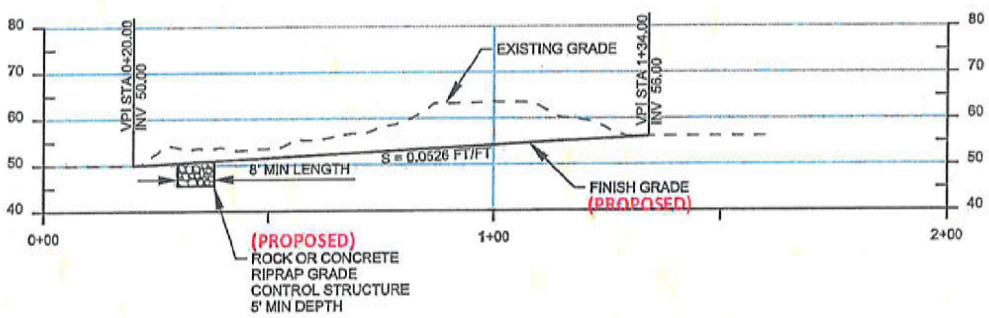
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**CHANNEL PROFILE**  
1"=40'

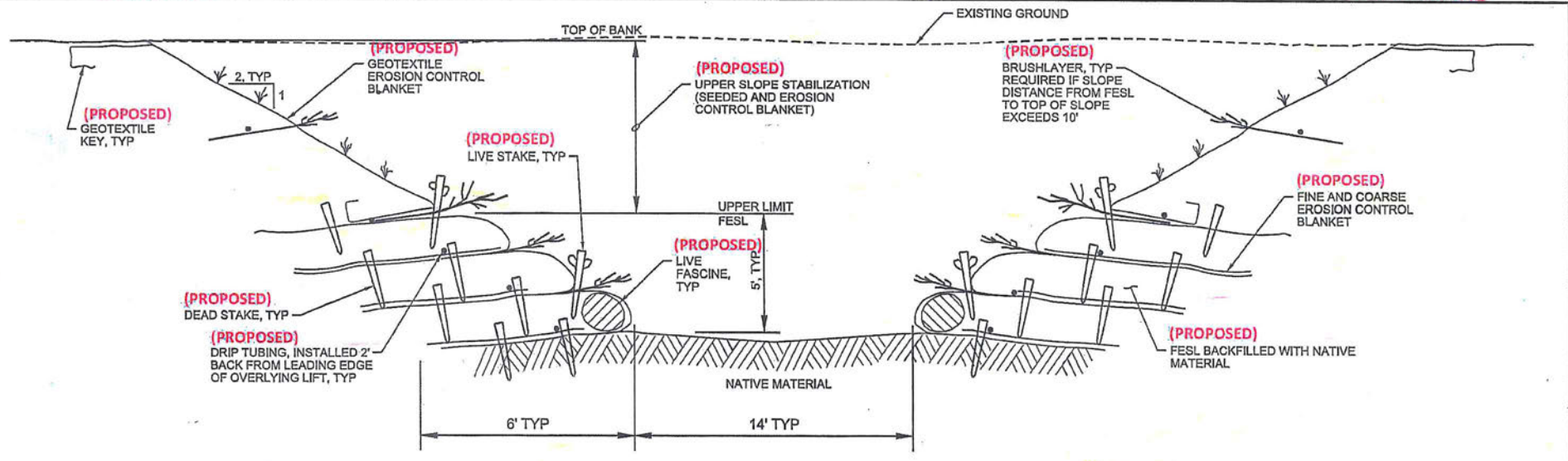
REVISED FEBRUARY 8, 2018

MCGOWAN ROAD  
JARVIS CREEK CROSSING  
RESTORATION SITE PLAN

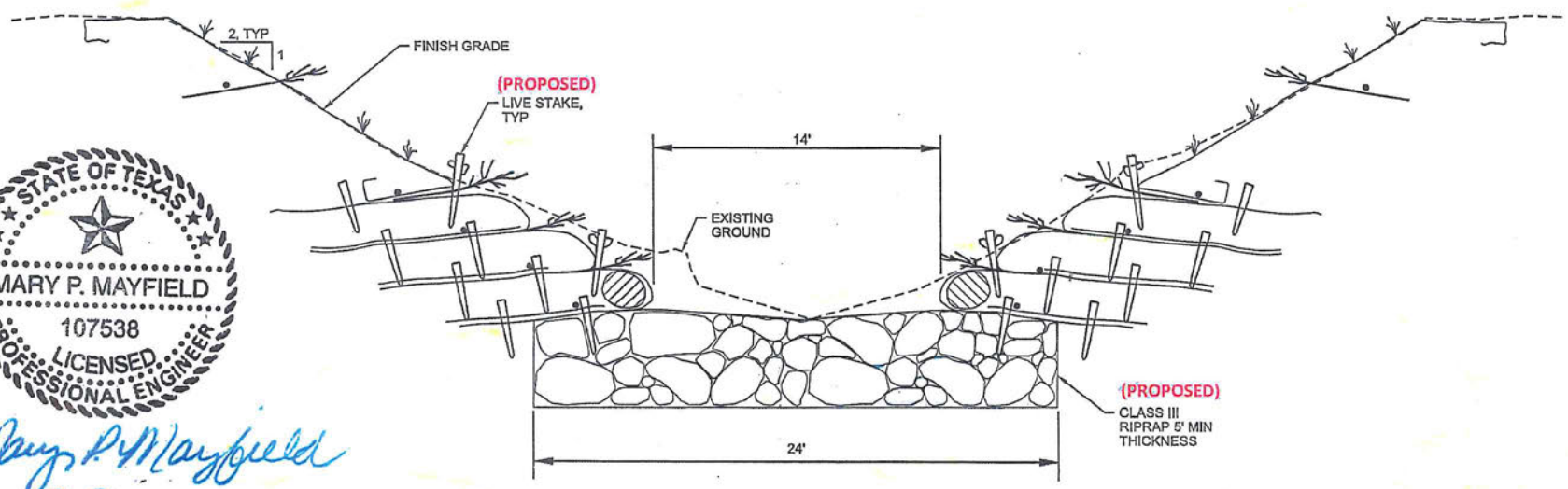
PCN-023







JARVIS CREEK RESTORATION SECTION @ PUMP STATION ROAD  
NTS



JARVIS CREEK ROCK GRADE CONTROL STRUCTURE SECTION @ PUMP STATION ROAD  
NTS

TYPICAL JARVIS CREEK RESTORATION SECTIONS

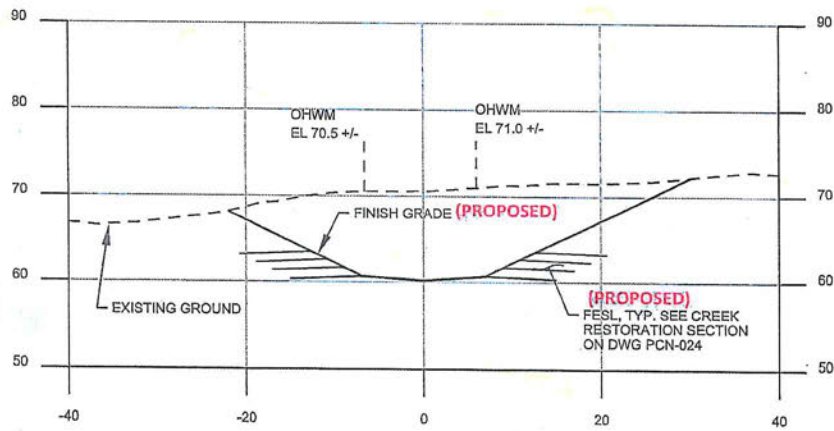
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PCN-024

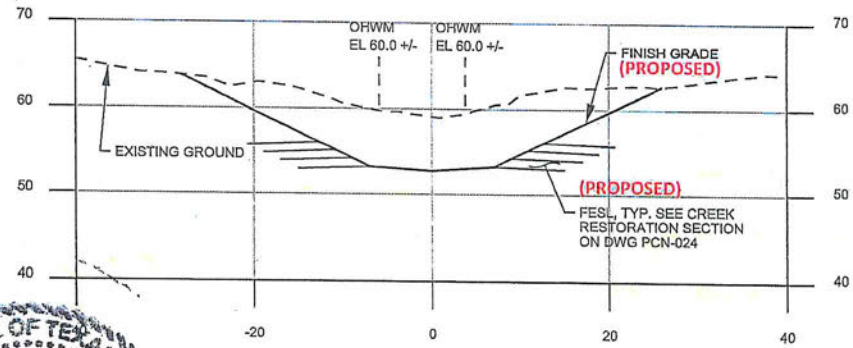


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**A** SECTION  
1"=20'  
PCN-021

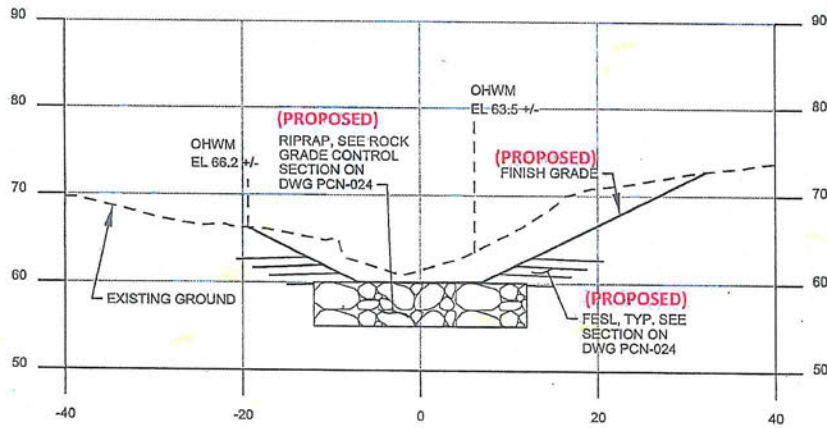


**C** SECTION  
1"=20'  
PCN-023

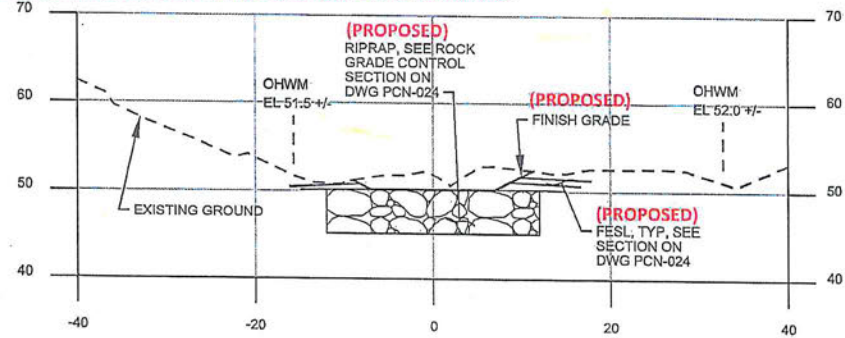


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**B** SECTION  
1"=20'  
PCN-021



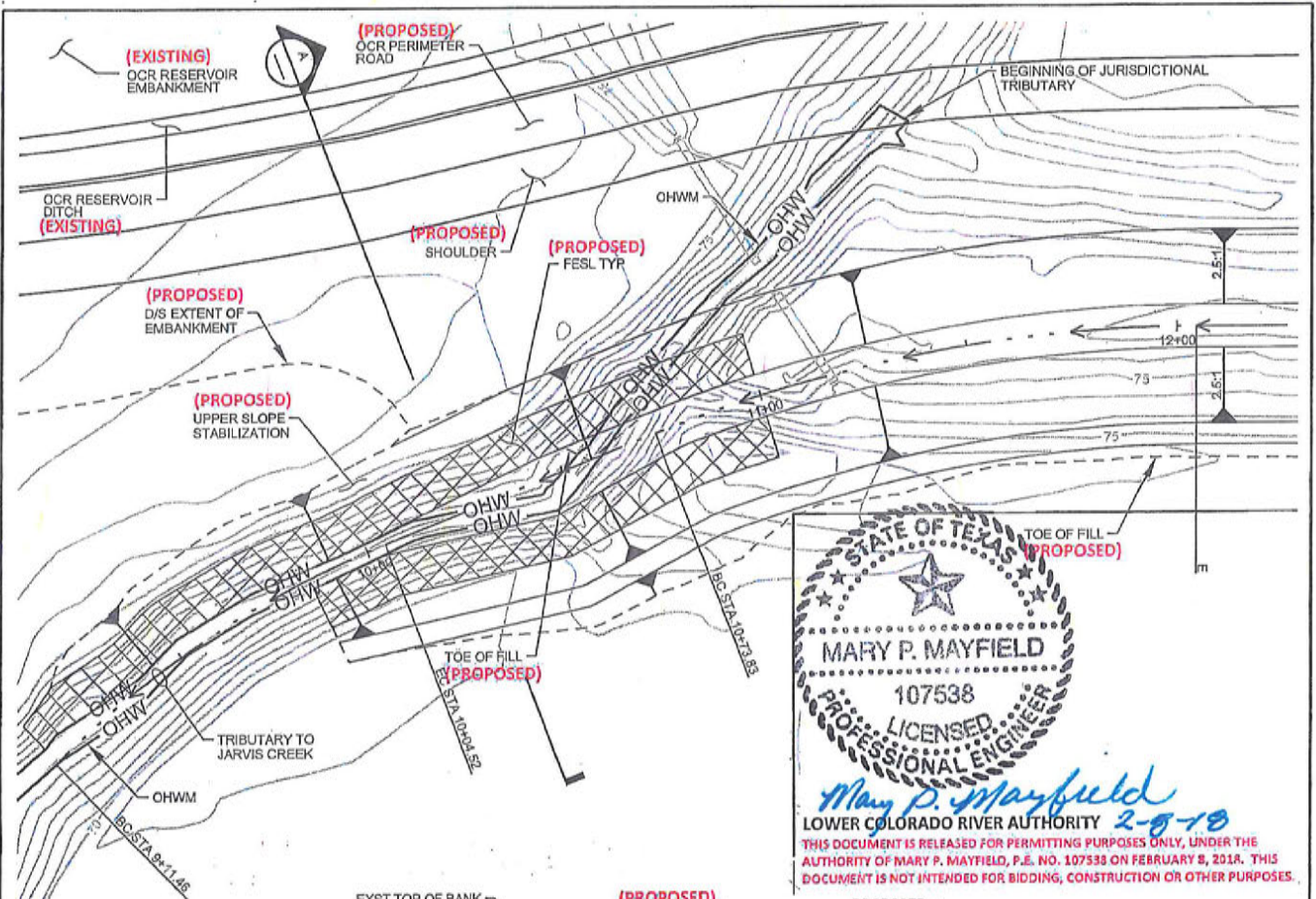
**D** SECTION  
1"=20'  
PCN-023

PUMP STATION ROAD AND MCGOWAN ROAD  
JARVIS CREEK RESTORATION  
SECTIONS

REVISED FEBRUARY 8, 2018

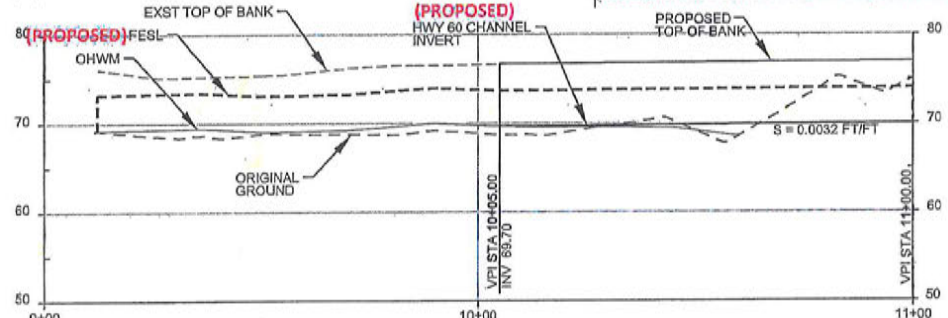
PCN-025



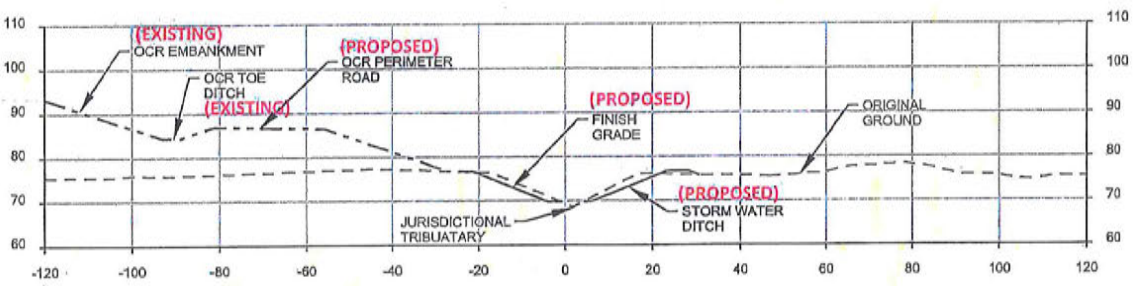


STATE OF TEXAS  
 MARY P. MAYFIELD  
 107538  
 LICENSED PROFESSIONAL ENGINEER  
*Mary P. Mayfield*  
 LOWER COLORADO RIVER AUTHORITY 2-8-18  
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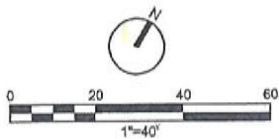
NOTES:  
 1. OHWM APPROXIMATED.



STORM WATER DITCH PROFILE



SECTION A  
 1"=40'

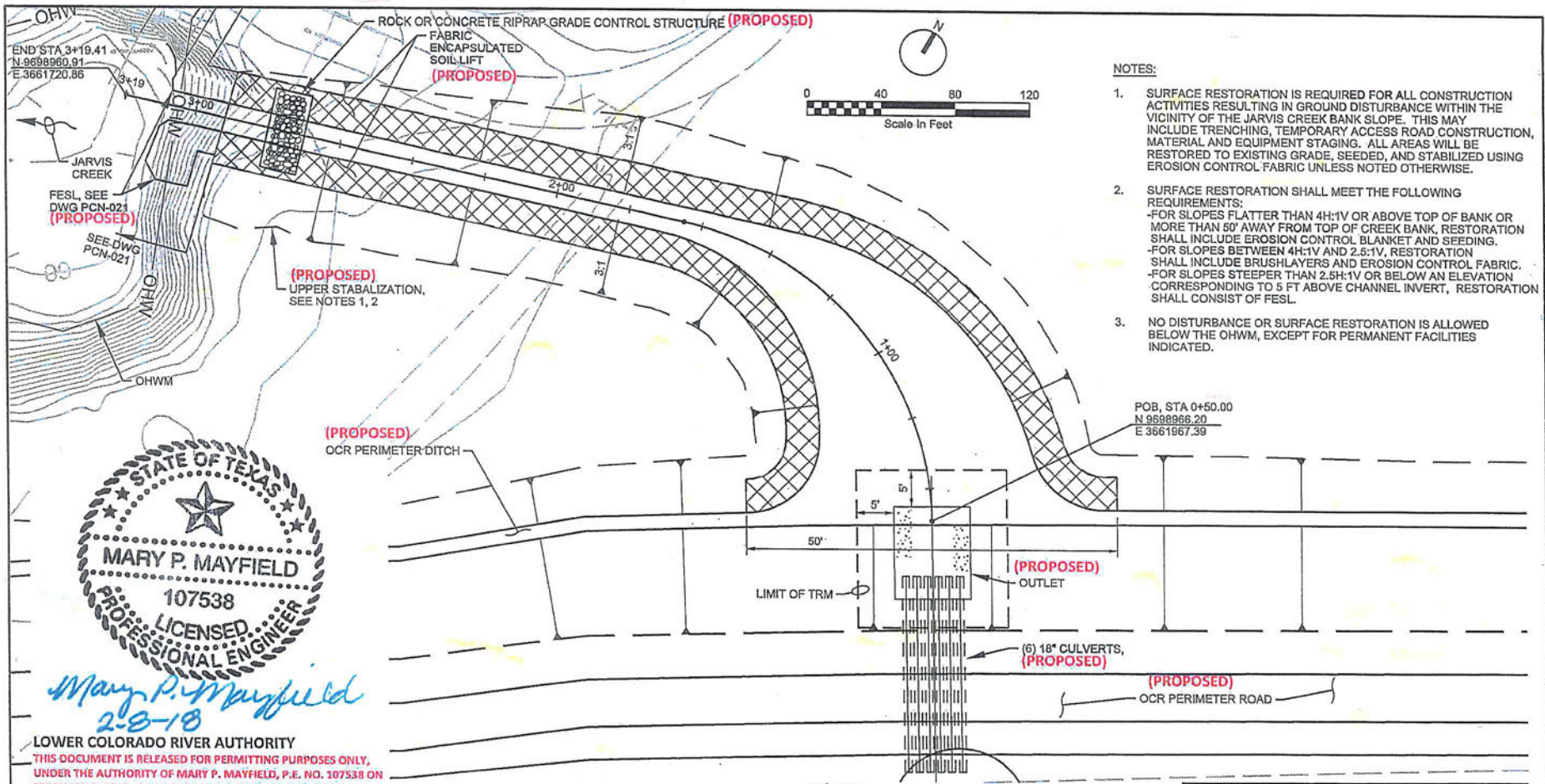


PERIMETER ROAD, EMBANKMENT AND STORM WATER DITCH OUTFALL TO UNNAMED TRIBUTARY TO JARVIS CREEK

REVISED FEBRUARY 8, 2018  
 PCN-026

**CH2MHILL**





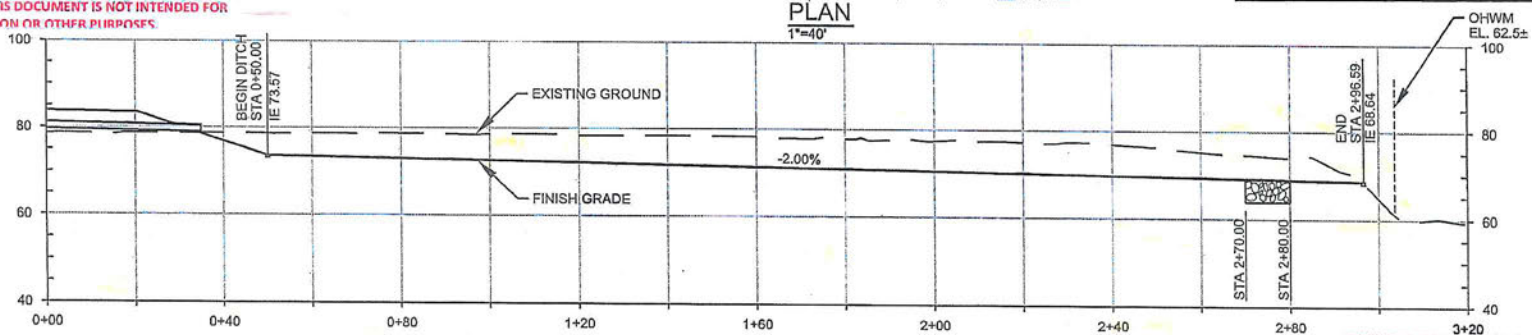
NOTES:

1. SURFACE RESTORATION IS REQUIRED FOR ALL CONSTRUCTION ACTIVITIES RESULTING IN GROUND DISTURBANCE WITHIN THE VICINITY OF THE JARVIS CREEK BANK SLOPE. THIS MAY INCLUDE TRENCHING, TEMPORARY ACCESS ROAD CONSTRUCTION, MATERIAL AND EQUIPMENT STAGING. ALL AREAS WILL BE RESTORED TO EXISTING GRADE, SEED, AND STABILIZED USING EROSION CONTROL FABRIC UNLESS NOTED OTHERWISE.
2. SURFACE RESTORATION SHALL MEET THE FOLLOWING REQUIREMENTS:  
 -FOR SLOPES FLATTER THAN 4H:1V OR ABOVE TOP OF BANK OR MORE THAN 50' AWAY FROM TOP OF CREEK BANK, RESTORATION SHALL INCLUDE EROSION CONTROL BLANKET AND SEEDING.  
 -FOR SLOPES BETWEEN 4H:1V AND 2.5:1V, RESTORATION SHALL INCLUDE BRUSHLAYERS AND EROSION CONTROL FABRIC.  
 -FOR SLOPES STEEPER THAN 2.5H:1V OR BELOW AN ELEVATION CORRESPONDING TO 5 FT ABOVE CHANNEL INVERT, RESTORATION SHALL CONSIST OF FESL.
3. NO DISTURBANCE OR SURFACE RESTORATION IS ALLOWED BELOW THE OHWM, EXCEPT FOR PERMANENT FACILITIES INDICATED.



*Mary P. Mayfield*  
2-8-18

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PROFILE  
1"=40'

OFF CHANNEL RESERVOIR STORMWATER  
 OUTFALL TO JARVIS CREEK PLAN AND PROFILE

REVISED FEBRUARY 8, 2018  
 PCN-030